



Impact Assessment support study for the revision of Directive 2005/44/EC on harmonised river information services (RIS)

Final Report – Technical Annexes

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Impact Assessment support study for the revision of Directive 2005/44/EC on harmonised river information services (RIS)

Final Report - Technical Annexes

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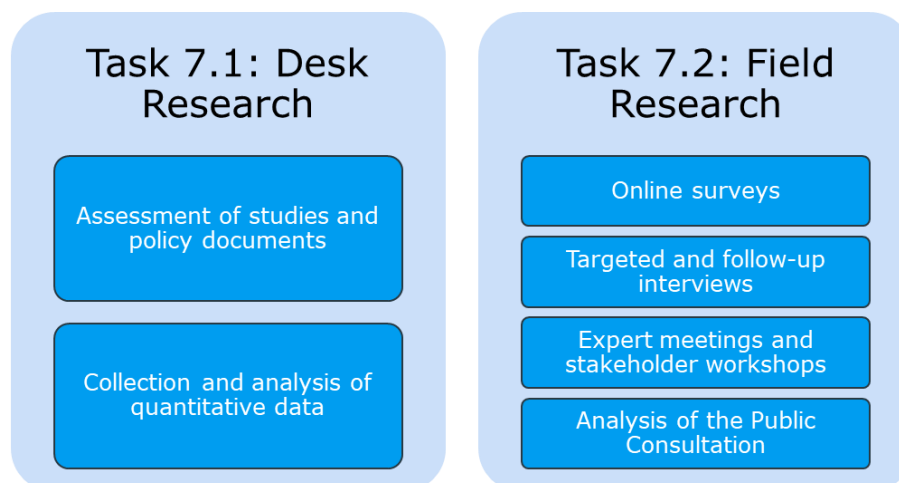
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Appendix 1. Data Collection

1. Overview of methodological approach

The evidence collection of this study represents a cross-cutting task consisting of data collection from two main sources: desk research and stakeholder consultation. It involved multiple tools and was conducted throughout the study supporting the analyses performed throughout the study. The overview of the different tools is provided in the figure below.

Figure 1: Overview of the tasks as part of task 7



Source: elaboration of the contractor (2022)

The output of this task culminated in key evidence and findings which acted as an important evidence base in which to assess the impacts of the proposed measures and policy options. In addition, based on all the data gathered and analysed as part of Task 7.2, a stakeholder consultation/synopsis report has been drafted. Below, the methodology for each of the two main elements is described in more detail.

Desk research

The desk research consisted of two parts: an assessment of relevant studies and policy documents and the collection and analysis of quantitative data. Each of the two main elements of the desk research is described in more detail below.

1. Assessment of relevant studies and policy documents

The first step of the assessment of relevant studies, evaluations and policy documents included the identification of relevant literature. The assessment of relevant studies, evaluations and policy documents focused on the broader, policy-level secondary sources such as policy and legal texts relating to the RIS Directive specifically, and the IWT sector more broadly; previous evaluations and studies to help understand the problems and their drivers; academic studies and reports which fed into an assessment of new developments/increased challenges that the IWT sector faces. Annex 9 presents the list of literature which has been considered and relevant findings have been integrated in the report throughout.

2. Collection and analysis of quantitative data

Many aspects of this IA study required the analysis of quantitative data. This is especially the case for Task 3 on the identification of the baseline scenario and Task 4 on the assessment of impacts of the identified policy options.

For this purpose, quantitative data on the identified types of impacts, building on those set out in section has been collected. Our efforts focused on quantitative data on environmental and social impacts as quantitative data, especially on the administrative costs of policy options for stakeholders, which were collected through the field research (see Task 7.2). Data on economic impacts collected as part of the desk research included relating to the macro-economic development of the IWT sector.

It should be noted that the data which was collected during the desk research provides information on the current states of these impacts, and not necessarily about the impacts of certain policy options in the future. The collected quantitative data has thus also contributed to identifying the problems under Task 1.

Field research

The field research employed for this study consists of the following four tools:

- Two targeted survey questionnaires
- A set of 40 targeted and follow-up interviews
- Active participation in two expert groups and organisation of two workshops
- Analysis of the Open Public Consultation (OPC) conducted by the European Commission

As part of the field research, the aim was to consult with stakeholders to gather their views on various aspects of the problems, policy options and impacts as identified by the study team. Indeed, a particular focus was placed on the surveys, which served to gather information from the perspectives of stakeholders, including SMEs. A full overview of all relevant stakeholders which have been identified and refined during the inception phase can be found in Annex II. The stakeholder map provides an assessment of the stakeholders' level of interest and influence relative to the RIS Directive. **Error! Reference source not found.** below presents our overall stakeholder consultation strategy. Except for the general public, all other stakeholder groups were consulted at least twice, and through different consultation methods during the study.

Table 1: Overall stakeholder consultation strategy

Stakeholder group	Targeted survey 1	Targeted survey 2	Structured interviews	Expert group meetings	Stakeholder workshops	Public consultation
IWT operators and navigation personnel	✓	✓	✓			✓
Port operators	✓	✓	✓			✓
Manufacturers of RIS applications	✓		✓			✓
Other private sector actors of supply chain operations and their business associations	✓	✓	✓			✓
Citizens						✓
Governmental / public authorities	✓	✓	✓	✓	✓	✓
International organisations	✓	✓	✓			✓
Organisations involved in research and innovation in IWT	✓	✓	✓			✓

Source: elaboration of the contractor (2022)

We have taken particular note of the risk of stakeholder fatigue throughout the design and implementation of the stakeholder consultation activities across the different phases of the study. Overall, we included gap-filling, validation and dissemination activities. It is worth stressing that due to the iterative nature of the study, gap-filling and validation activities occurred both during the design and analytical phases of the study.

Targeted survey questionnaires

The purpose of the surveys was to collect quantitative and qualitative data. The surveys provided the opportunity for respondents to cite examples of quantitative figures and point to other data sources. This data therefore encouraged a broader range of data to be provided, aiding the filling of gaps from the desk research, as well as providing descriptive statistics of answers and the quantification of qualitative answers.

The study implemented two “smart” surveys (with the possibility of filtering questions depending on the respondent) that reached two distinct stakeholder groups. To assist the evidence collection for this study, two surveys were developed which were targeted to all relevant stakeholders likely to have an interest in (or be affected by) the RIS Directive:

- **Survey 1** aimed to provide an opportunity for stakeholder to share their opinions on the identified problems as well as their assessments of the policy measures. This survey was divided into four main sections: profiling questions, feedback on the problem drivers, estimations of costs and benefits (to feed into the baseline assessment) and initial feedback on the proposed policy measures in terms of well they address the identified problems. This survey was launched on the 1st of August 2022 and has been closed on the 26th of August.

- **Survey 2** aimed to gather evidence (quantitative and qualitative) and opinions on the expected impacts of the different policy measures which have been proposed to address the identified problems.

To disseminate the questionnaires to relevant stakeholders (i.e. national authorities and private sector representative bodies/users) we relied on a combination of DG MOVE's contacts in the area, the contacts of our experts at TML Leuven and Panteia, and national authorities' and national associations' member contacts. For national authorities' and national associations' contacts, we also rely on the assistance of national associations in disseminating the questionnaire to their members and carrying out any follow-up actions.

The results of the surveys were analysed in Excel using descriptive statistical methods. Graphs are produced for each (group of) question(s) asked.

Targeted and follow-up interviews

The interview programme followed the results of the first survey and ran throughout September and October. The content of the interviews was based on the findings from on the desk and field research conducted in order to complement these and fill the knowledge gaps which are still there. Moreover, the interviews provided an opportunity to respondents to go into more details in a qualitative way. It primarily fed into the assessment of impacts from the perspective of individual stakeholders. In particular, the interviews will serve a dual purpose:

- To follow-up on the targeted consultations where data gaps remain and seek further clarifications as required
- To gather evidence in relation to elements for which qualitative data is judged to be an important source, namely in terms of non-quantifiable impacts

Based on stakeholder mapping, interviews were carried out with a sample of key stakeholders per main stakeholder type identified, as set out in **Error! Reference source not found.** for a total of 40 targeted interviews. As part of Stakeholder Survey 1, several respondents noted their interest to participate as part of a follow up interview. These respondents were included in the 40 proposed interviewees below.

Table 2: List of interviewees

Stakeholder group	Stakeholder type	No. of proposed interviews	No. of interviews
Public bodies: International level	Shipping Regulation / Technical Certification Authority	2	1
Public bodies: European level	River Commissions	2	3
	Other RIS related bodies	1	2
Public bodies: National level	Port Authorities	2	0
	National RIS authorities	15	10
	Calamity abatement support / agencies	1	1
Private sector companies / representative organisations	Professional Associations (European level) representing IWT operators and port operators	3	6
	Professional Associations (national level) and the IWT operators, navigation personnel and port operators they represent.	12	3
	Developers of RIS	2	3
Total		40	29
Response rate			22%

Source: elaboration of the contractor (2022)

The data gathered through interviews were summarised in individual interview reports after each interview. The data collected through the interviews were coded and analysed through qualitative data analysis.

Participation in stakeholder workshops and expert groups

To facilitate further discussion with the key stakeholders from the RIS field, we took active part in a series of expert group meetings and stakeholder events. In total, the team joined two expert group meetings.

Expert groups

We attended a series of expert groups sessions over the course of the IA of the DINA (E03505) and NAIADES (E03497) Expert Groups. These meetings brought together representatives of relevant Member States and other experts representing different interests and types of expertise in the IWT sector were presented. The expert group members answered specific and technical questions related to the scope of the IA.

Table 3: Purpose and scope of the expert group meetings

When	Purpose	Scope
Design and/or analytical phase of the study	Gap-filling and validation	- Discuss the feasibility of the proposed policy options - Discuss the selection of most relevant impacts - Identify additional sources/stakeholders to consult to fill any identified gaps
Synthesis phase of the study	Validation	- Validate the feasibility of the selected policy option - Validate the assessment of the selected impacts - Validate the feasibility of the proposed monitoring approach

Source: elaboration of the contractor (2022)

Analysis of the public consultation

The European Commission launched an Open Public Consultation (OPC) in early August to gather the opinions of the broader stakeholder community on a possible revision of Directive 2005/44/EC; and was open for 12 weeks until mid-November.

Following the end of the OPC period, the team supported the Commission in its consultation activities by assessing and summarising the results of both the questions of the OPC and the written contributions submitted as part of the OPC.

Firstly, the data from the OPC went through a process of data cleaning whereby any errors, inconsistencies or non-plausible responses will be checked and cleaned. An important part of this process includes checking for any organised campaigns between the responses as detailed in the BRG. This was done by looking for multiple identical answers, which indicates responses as part of organised campaigns. This task was also important as a way to assess the overall reliability of the responses and considering any possible bias that may be induced.

Following this, answers to the closed questions were analysed to assess the tendency and dispersion of responses across each of the questions. The responses for each question were also be checked for any trends or comparisons between different types of stakeholders and geographic origin. These results were presented both graphically (through stacked bar charts and if possible, geographic distribution through maps) and in tabular form (for granular level analysis).

In addition to the analysis of the questions in the OPC questionnaire, the respondents were invited to submit position papers which can enable further elaboration of the questions asked. In a similar approach to that carried out for the desk research and interviews, the position papers were analysed using QDA software. This included a screening of the

documents, classification and an in-depth analysis of the contributions in terms of relevance to the key areas of the IA (problem definition, policy measures and options and assessment of impacts).

2. Stakeholder Survey 1 Analysis

The purpose of this survey was to gain an understanding of the stakeholder views on the identified problems and their assessment of the policy measures.

The survey was distributed to 229 stakeholders, of which 46 have completed it and 71 partially completed it (i.e. started completing the survey but did not answer all questions) at the time of the analysis. Out of the 71 partially completed answers, 19 responses covered at least the profiling and problem driver questions as well as the majority of the costs questions and were thus considered in the analysis for the questions where answers have been provided. In line with the Better Regulation Guidelines and Toolbox, the survey data was assessed for any entries that may be incomplete, contain duplicates, or contain errors. As such, each graph provides the number of responses per answer question. It should also be noted that in the context of this analysis “N” represents the full population size, while “n” refers to the sample sizes.

The survey is structured and presented across four key areas:

- Profiling
- Problem and problem drivers
- Situation under the current RIS Directive
- Feedback on the draft policy measures

Profiling questions

To start, respondents were asked a series of profiling questions, specifying which country they primarily work in and which stakeholder category they belong to. This information is useful in that it helps to identify any correlations or differences between responses and stakeholder categories, which will aid the triangulation of data in the final analysis phase of this study.

Figure 2: Which country do you primarily work in? (n=65)

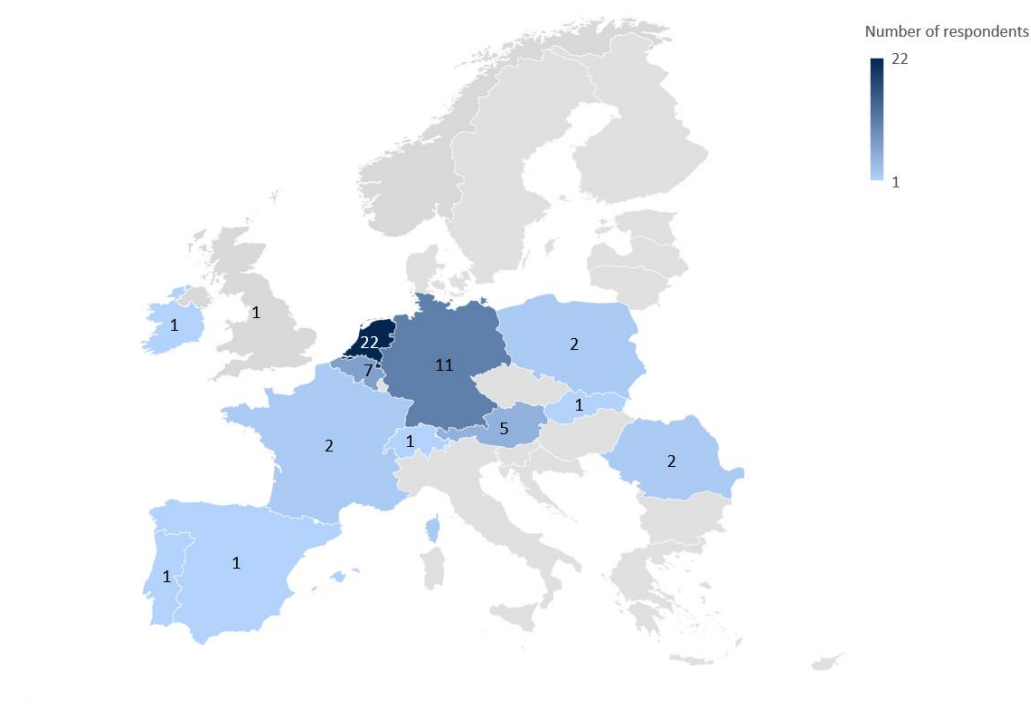


Figure 1 presents the geographical scope of the countries where the stakeholders primarily work in. The highest number of stakeholders work primarily in the Netherlands (22 respondents), followed by Germany (11 respondents), Belgium (seven respondents) and Austria (five respondents).

Eight stakeholders responded working in more countries than one, with two stakeholders working in the Netherlands, Belgium and Germany; one working in the Netherlands, Germany, Hungary, Slovakia, Belgium, Austria and Serbia; two working in an international organisation, one in a River Commission, one internationally between the Netherlands, France, Germany and Belgium, and one across Europe.

Figure 3: Which stakeholder category best describes you? (N=65)

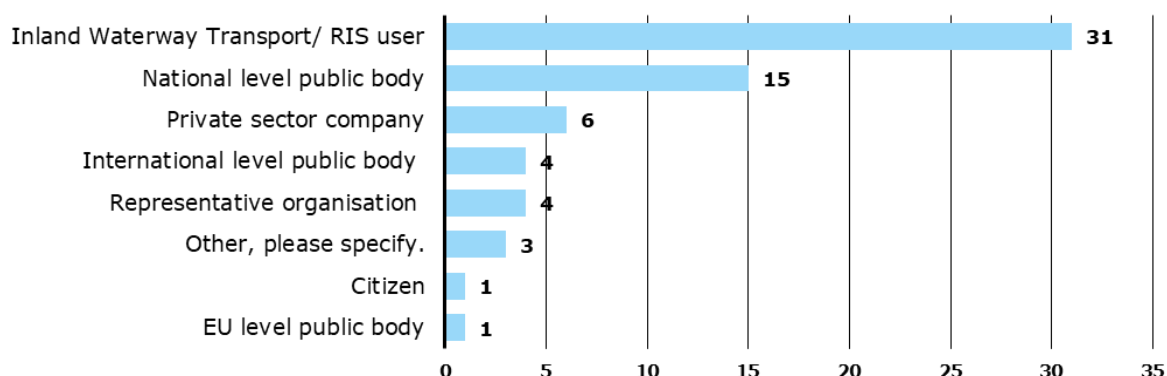


Figure 2 presents the stakeholder categories of the respondents. The majority of the respondents are either inland waterway transport or RIS users (31 respondents) or national level public bodies (15 respondents).

Three stakeholders who chose “other” responded as a RIS software or systems developer; private, national, professional association promoting smart mobility/Intelligent Transport Systems; and accepted expert for ship’s electronic equipment by German authority.

Figure 4: Please indicate which specific stakeholder category you belong to. (n=8)



Figure 26 3 presents the specific stakeholder category for those who responded “private sector company” or “representative organisation” to the question above. Three of the eight respondents work in a European level professional association, and two as marine or RIS equipment manufacturer. One stakeholder works in a national level professional association, and two (other) in RIS equipment supplier/ installation/ services and in a non-profit association.

Figure 5: Please indicate which specific stakeholder category you belong to. (n=20)

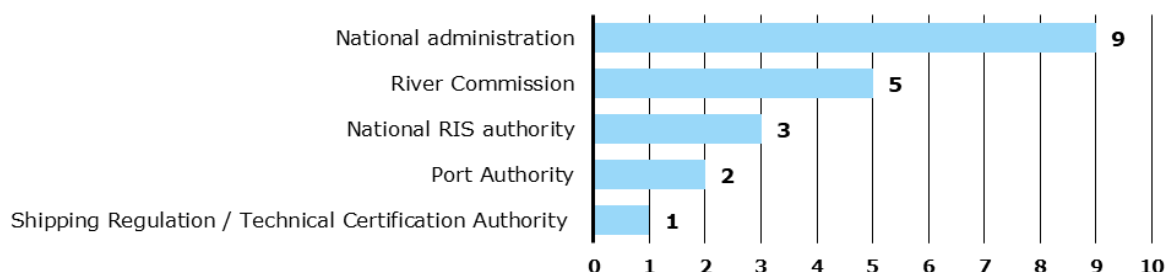


Figure 5 presents the specific stakeholder categories for those who responded, “national level public body”, “international level public body” or “EU level public body” as their stakeholder category. Out of the 20 respondents, nine selected national administration, five selected river commission, three national RIS authority, two port authority and one respondent selected shipping regulation or technical certification authority. Two of the respondents who selected national administration specified national waterway operator and national RIS authority, shipping regulation or technical certification authority.

Figure 6: Which specific type of specific stakeholder do you operate as? (n=29)

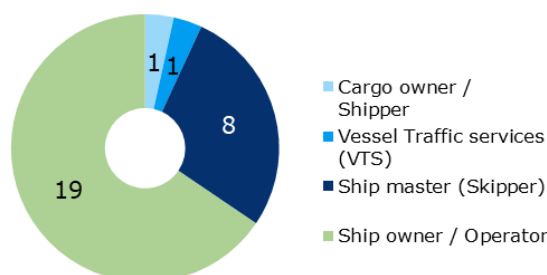


Figure 6 presents the specific type of specific stakeholder those who responded “inland waterway transport/RIS user” operate as. Out of the 29 respondents, the majority (19 stakeholders) operate as ship owners or operators, followed by ship masters or skippers (eight stakeholders). One stakeholder operates as cargo owner or shipper, and one in Vessel Traffic Services.

Figure 7: How many employees does your organisation have? (n=37)

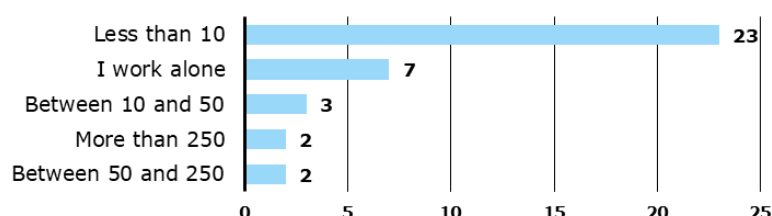


Figure 7 presents the number of employees the stakeholders' organisations have. The majority of the 37 respondents have less than 10 employees (23 respondents), and seven stakeholders stated that they work alone.

Problem and problem drivers

This section of the survey looked at the main problem and problem drivers which were identified in the first stages of this study, and which could be addressed by a revision of the RIS Directive. As part of this study, the overall problem that has been identified and that could be addressed in a revised version of the RIS Directive is the following:

The deployment of River Information services in the EU is slow and fragmented. This has an impact on the competitiveness and safety of the IWT sector, as well as restricting the contribution of the sector in the achievement of the European Green Deal objectives.

Five problem drivers were developed to further explain the underlying causes to this overall problem.

Figure 8: In your view, are the problem drivers listed below problems which the IWT/ RIS sector currently faces? (N=65)

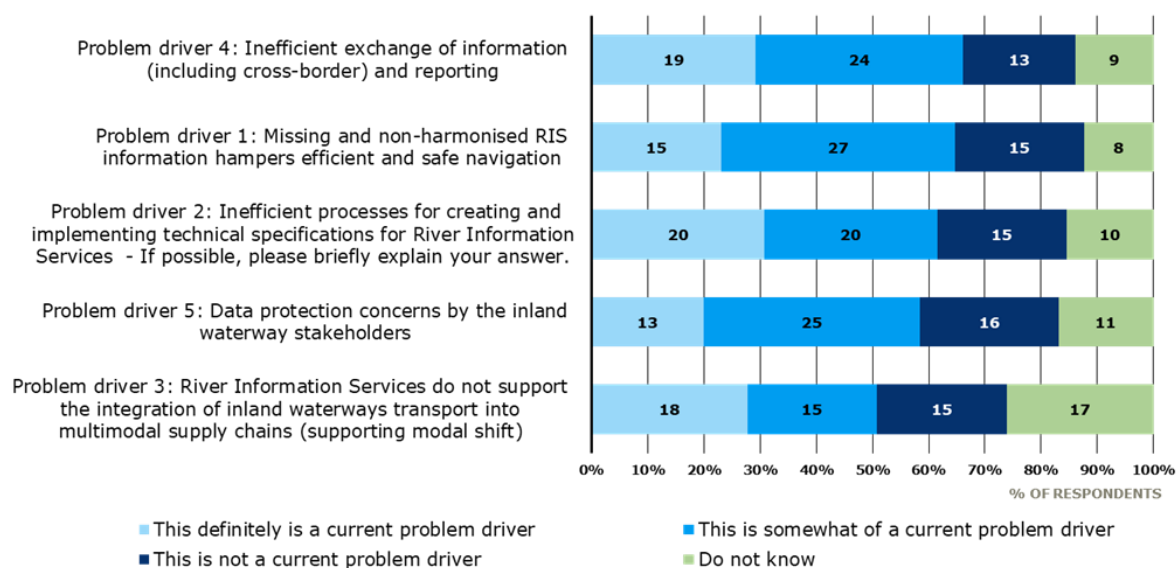


Figure 8 presents the five problem drivers and the extent to which the stakeholders found these to be current issues that the IWT/RIS sector faces. Overall, there is no significant variation between the problem drivers. The majority of the stakeholders (approximately 60-65%) believed all problem drivers to either definitely be a current problem driver or somewhat of a current problem driver. Problem driver 3 (Information Services do not support the integration of inland waterways transport into multimodal supply chains) was found to be a current problem by slightly fewer stakeholders, with 33 stakeholders finding it to either be definitely or somewhat of a current problem driver and 15 stakeholders stating that it was not a current problem driver. In terms of stakeholder differences across the problem drivers, approximately half of those who responded “this definitely is a current problem driver” were inland waterway transport/RIS users for all except problem driver 3, for which the most frequent responses were from national public bodies.

From the open-ended responses, it was found that for problem driver 1, three stakeholders¹ stated that the RIS index is not sufficiently reliable or clearly defined from a legal point of view. For problem driver 2, five stakeholders² stated that a reference to Es-RIS updated every two years by CESNI would be a solution to streamline the update of technical specifications. For problem driver 3, four stakeholders³ emphasised the need for a multimodal routing tool which gives preference to climate friendly transport modes. For problem driver 4, three stakeholders⁴ stated that while it’s still somewhat of an issue, EURIS and CEERIS have brought many improvements. For problem driver 5, four stakeholders⁵ expressed concerns regarding GDPR and data protection at Member State level, which might result into limits to the usage of RIS data in view of data protection laws.

¹ All international level public bodies

² Three international level public bodies, two national level public bodies

³ Three national level public bodies, one private association

⁴ Three national level public bodies

⁵ Three international level public bodies, one national level public body

Figure 9: If the current RIS Directive is not revised, how do you expect the following problem drivers to develop in the future? (n=59)

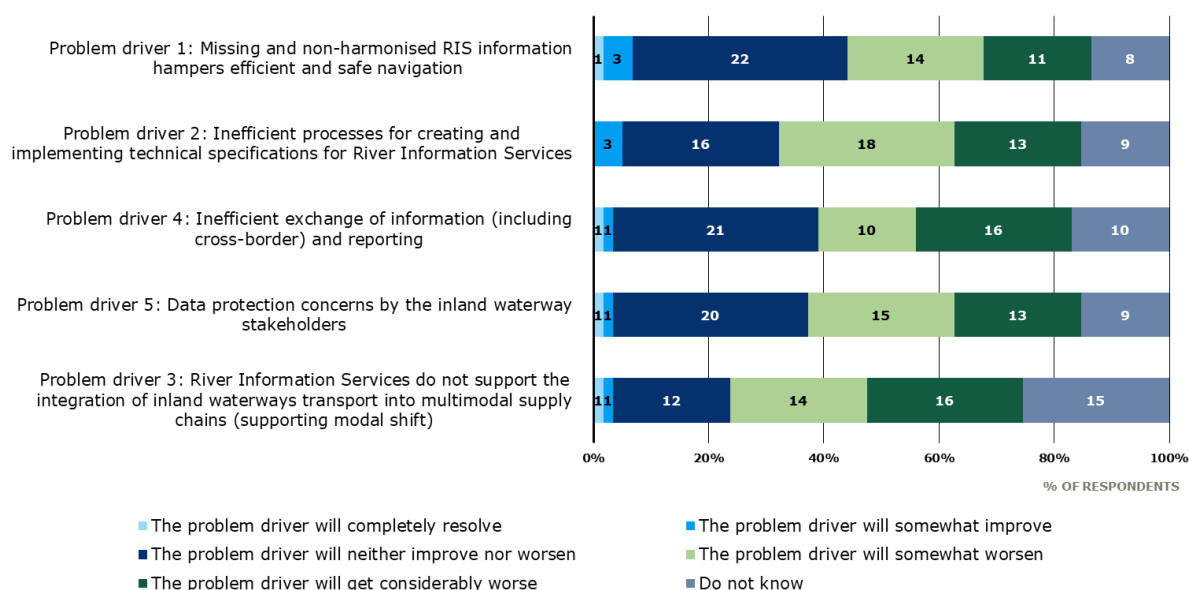


Figure 9 presents the stakeholder views on how the problem drivers might develop in the future if no revisions are made to the current RIS Directive. The majority of stakeholders across the five problem drivers considered that the problem will either get considerably worse or will neither improve nor worsen. Only one stakeholder argued that the problem driver will completely resolve for four of the problem drivers. The main problem drivers that the stakeholders considered will get considerably worse in the future were problem driver 3 (River Information Services do not support the integration of inland waterways transport into multimodal supply chains) and problem driver 4 (inefficient exchange of information and reporting).

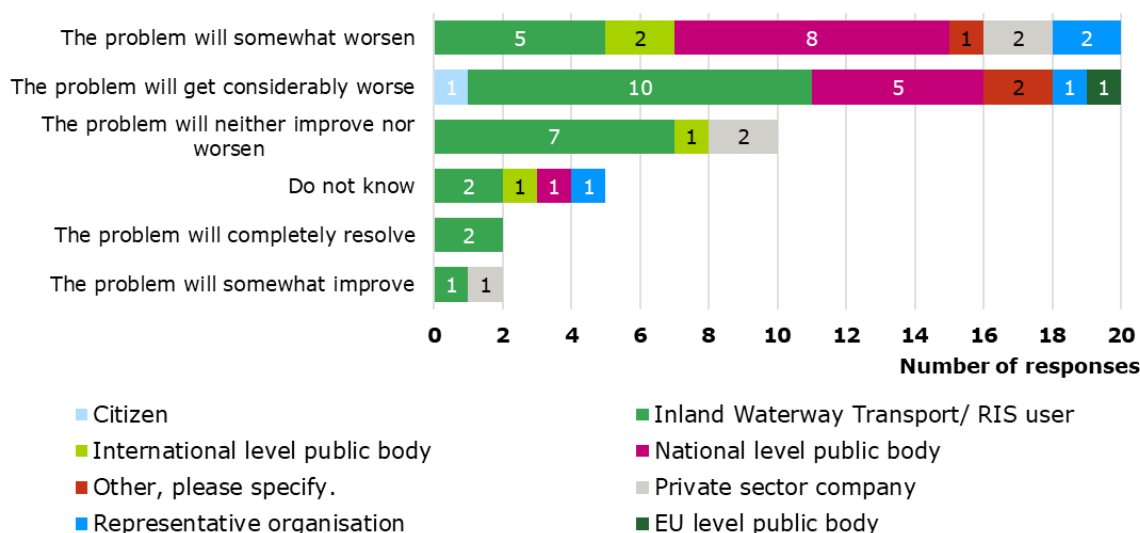
In terms of stakeholder differences across the problem drivers, the majority who responded “the problem will get considerably worse” for problem driver 5 were inland waterway transport/RIS users (nine out of 13 respondents), while for problem drivers 3 and 4 the majority were inland waterway transport/RIS users (seven and seven stakeholders respectively) and national level public bodies (six and five stakeholders respectively). Approximately half of the stakeholders who responded “the problem will get considerably worse” for problem driver 2 were inland waterway transport/RIS users (six out of 13 respondents), while for problem driver 1 there were no significant differences between the stakeholder types.

Figure 10: Considering the overall problem described above, if the current RIS Directive is not revised, how do you expect the problem to develop in the future? (n=59)



Figure 10 presents the stakeholder views on how the overall problem might develop in the future if no revisions are made to the current RIS Directive. The majority of stakeholders considered that the problem will get considerably worse (20 respondents) or will somewhat worsen (20 respondents). Only four stakeholders argued that the problem will somewhat improve or completely resolve. As can be seen from Figure 11 below, the stakeholder responses are largely split across the different stakeholder types.

Figure 11: Expectations of the development of the problem by stakeholder type



When asked whether there are additional problem drivers or problems which should be addressed as part of the revision of the RIS Directive, 24 responses were received. Six stakeholders⁶ referred to the implementation of measures and issues related to it, such as the large variations in the practical implementation in Member States, little consideration given to the large group of recreational crafts that are obliged to use an AIS, and national bodies not fully following the implementation standards creating problems for EU wide implementation. Automation, specifically automated navigation, automation of vessel operation and automated vessel command was mentioned by two stakeholders.⁷

Figure 12: Are you aware of any current or future developments/ initiatives which may have an impact on a future RIS in the EU? (n=58)

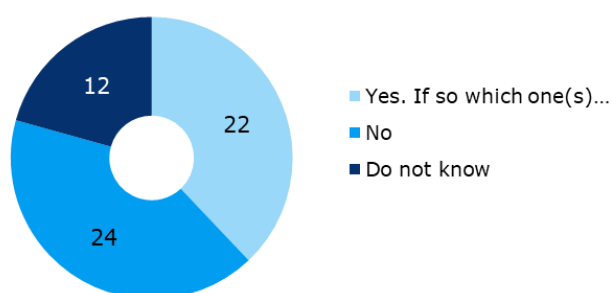


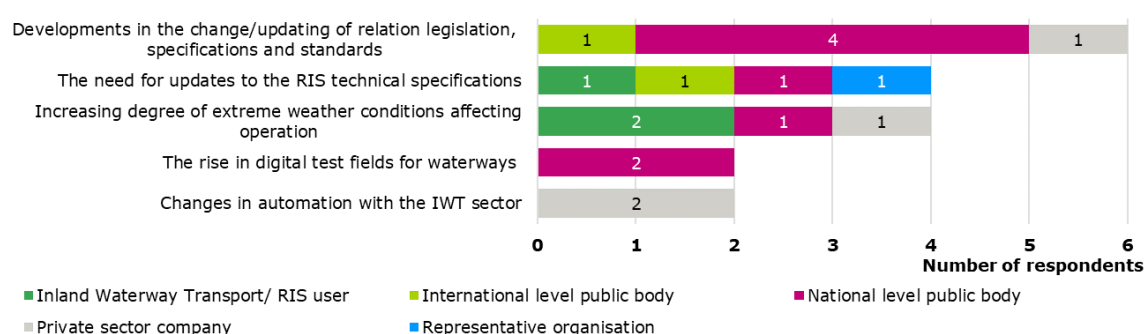
Figure 12 presents the number of stakeholders who are aware of any current or future developments or initiatives which may have an impact on a future RIS in the EU. Out of the total of 58 respondents, 22 responded yes. When asked to explain the current or future

⁶ Two international level public bodies, two Inland Waterway Transport/RIS users, two private sector companies

⁷ National level public body, private sector company

developments or initiatives, and how this may impact the overarching problem identified in this study, 18 stakeholders provided a response. The responses are presented by stakeholder type in Figure 13 below. Six stakeholders referred to developments in the change or updating of relation legislation, specifications and standards, of which four were national level public bodies. Four stakeholders stated that there is a need for updates to the RIS technical specifications, and four stated that the increasing degree of extreme weather conditions may affect operations, such as causing AIS equipment not to function or to function to a limited extent and increase or tighten technical requirements for ECDIS equipment and software. As a result, the costs of purchase and maintenance increase significantly, especially for pleasure craft often sailing less than 200 hours a year. Two stakeholders mentioned the rise in digital test fields for waterways, and two referenced changes in automation with the IWT sector.

Figure 13: Current or future developments/ initiatives which may have an impact on a future RIS in the EU by stakeholder type (n=18)



Situation under the current RIS Directive

This section of the survey explored the costs and burdens that the stakeholders, their organisations or members face resulting from the RIS Directive as it currently stands.

Firstly, respondents were asked how much time on average they spend providing documentation (e.g. analogue and digital, i.e. mariphone or ERI) to authorities for each voyage when they enter a new port or waterway management area. The question was only targeted at inland waterway transport/RIS users, and it received 25 responses, out of which eight respondents said they spend either very little time or between 2-15 minutes providing documentation. Two stakeholders responded spending half an hour, seven stakeholders responded spending between 1-2 hours, and one stakeholder between 5-10 hours.

Figure 14: How burdensome do you consider the following activities/tasks? (n=25)

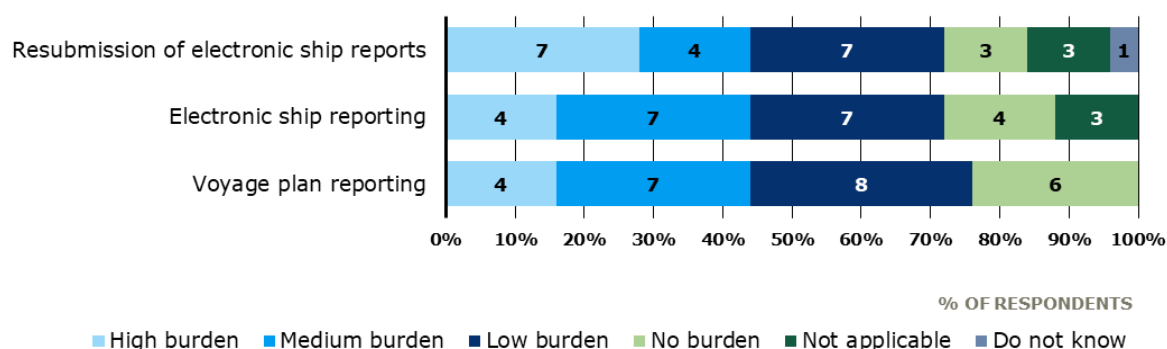


Figure 14 presents the responses to how burdensome the stakeholders consider resubmission of electronic ship reports, electronic ship reporting and voyage plan reporting.

The results show that the highest burden is with resubmission of electronic ship reports, with seven stakeholders finding it to be a high burden and four a medium burden. Voyage plan reporting was found to be the lowest burden for stakeholders, with eight reporting it was a low burden and six that it was no burden.

Respondents were then asked to provide an **estimate of either monetary cost, or time spent per type of report**.

For **monetary costs for the first voyage plan report**, three stakeholders⁸ responded spending between EUR 20 and EUR 25, one⁹ responded EUR 60, one¹⁰ between EUR 25 and EUR 250 and one¹¹ responded spending EUR 100 per report. Three stakeholders responded that there were no monetary costs, and two not having the information available or not knowing. In terms of time spent to fill out each report, six stakeholders¹² responded spending between 2 and 20 minutes per report, while two¹³ responded spending 30 minutes. Four stakeholders¹⁴ responded spending one hour, and one¹⁵ responded anywhere between 30 minutes up to 2 hours depending on the cargo and destinations.

For **monetary costs for daily updates in the voyage plan reporting**, five stakeholders¹⁶ responded spending between EUR 10 and EUR 30, and one¹⁷ responded spending EUR 75. Four stakeholders responded there being no monetary costs, and two not having the information available or not knowing. In terms of time spent to fill out each report, five stakeholders¹⁸ responded spending between 1 to 5 minutes, five¹⁹ responded spending between 10 and 20 minutes and two²⁰ responded spending between 30 and 45 minutes.

Regarding **monetary costs for the first electronic ship report per trip**, five stakeholders²¹ responded spending between EUR 10 and EUR 25, and two²² between EUR 60 and EUR

⁸ Two ship owner/operator, one ship master (skipper)

⁹ Ship owner/operator

¹⁰ Ship owner/operator

¹¹ Ship owner/operator

¹² Four ship owner/operator, one cargo owner/shipper, one ship master (skipper)

¹³ Ship master (skipper)

¹⁴ Three ship owner/operator, one ship master (skipper)

¹⁵ Ship owner/operator

¹⁶ Four ship owner/operator, one ship master (skipper)

¹⁷ Ship owner/operator

¹⁸ Four ship owner/operator, one ship master (skipper)

¹⁹ Two ship owner/operator, two ship master (skipper) and one cargo owner/shipper

²⁰ Ship owner/operator

²¹ Four ship owner/operator, one ship master (skipper)

²² Ship owner/operator

75. Four stakeholders responded there being no monetary costs, and two not having the information available or not knowing. In terms of time spent to fill out each report, four stakeholders²³ reported spending between 1 and 5 minutes, five²⁴ responded spending between 10 and 15 minutes and five²⁵ responded spending between 30 and 45 minutes.

For the **resubmission of electronic ship reports**, five stakeholders²⁶ responded spending between EUR 5 and EUR 20, one²⁷ responded EUR 50 and one²⁸ responded spending EUR 120. Four stakeholders responded there being no monetary costs, and one not having the information available. In terms of time spent to fill out each report, six stakeholders²⁹ responded spending between 1 and 5 minutes, three³⁰ responded spending between 10 and 20 minutes, two³¹ responded spending 30 minutes and one stakeholder³² reported spending 50 minutes.

Overall, the majority of the respondents across the types of reports reported low monetary costs and time spent for each report. For medium or high monetary costs and time spent filling out each report, there were between one to four respondents.

Figure 15: What degree of monetary costs do you face in relation to the following? (n=22)

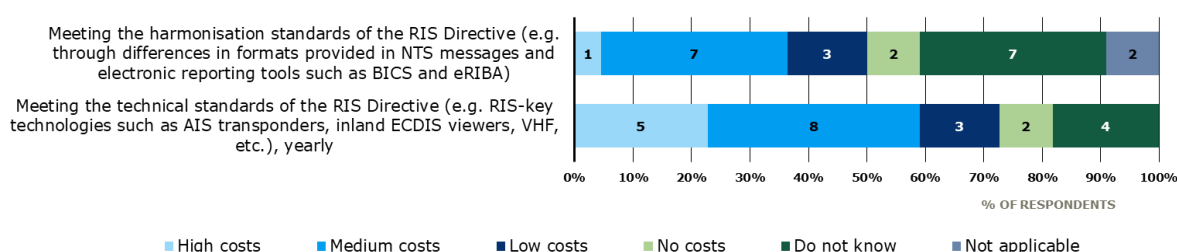


Figure 15 presents the degree of yearly monetary costs the stakeholders face in meeting the harmonisation standards and the technical standards of the RIS Directive. The question was only targeted at inland waterway transport/ RIS users. The results show that the stakeholders face higher costs in meeting the technical standards, with five stakeholders stating they face high costs and eight responding medium costs.

²³ Ship owner/operator

²⁴ Three ship owner/operator, one cargo owner/shipper, one ship master (skipper)

²⁵ Two ship owner/operator, three ship master (skipper)

²⁶ Four ship owner/operator, one ship master (skipper)

²⁷ Ship owner/operator

²⁸ Ship owner/operator

²⁹ Five ship owner/operator, one ship master (skipper)

³⁰ Ship owner/operator, cargo owner/shipper, ship master (skipper)

³¹ Ship owner/operator, ship master (skipper)

³² Ship owner/operator

When asked to provide an estimate of the costs per year for meeting the technical standards, only six stakeholders provided a response. Three stakeholders³³ reported the costs to be between EUR 400 and EUR 500, one stakeholder³⁴ responded EUR 800, one³⁵ EUR 1,500 and one³⁶ EUR 2,500. For the costs per year for meeting the harmonisation standards, only three stakeholders provided a response, one³⁷ reporting the costs to be EUR 100, one³⁸ EUR 500 and one³⁹ EUR 750. When asked how these estimates had been calculated, four stakeholders mentioned the use of ECDIS and three mentioned AIS transponders.

Figure 16: What costs does your administration face in relation to the following? (n=13)

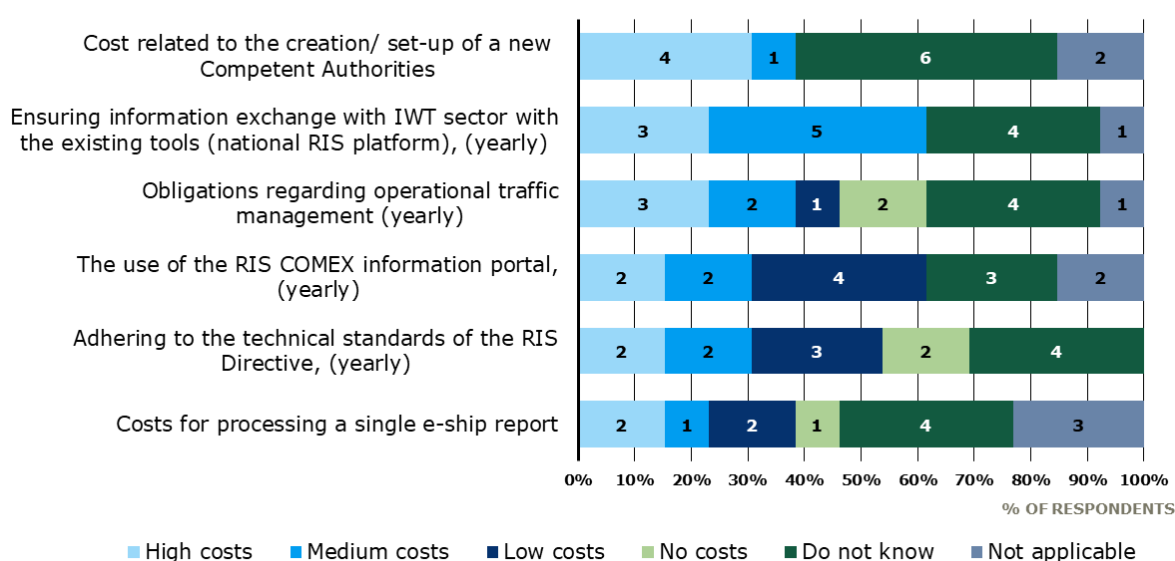


Figure 16 presents the level of costs that the stakeholders' administration face in relation to the six areas shown. The results show that the highest costs for the administration are

³³ Two ship owner/operator, one ship master (skipper)

³⁴ Ship owner/operator

³⁵ Ship owner/operator

³⁶ Ship owner/operator

³⁷ Ship owner/operator

³⁸ Ship master (skipper)

³⁹ Ship owner/operator

related to the creation or set-up of new Competent Authorities, with four stakeholders reporting high costs and one reporting medium costs, and to the costs related to ensuring information exchange with IWT sector with the existing tools, with three stakeholders reporting high costs and five reporting medium costs. The lowest costs were reported for the use of the RIS COMEX information portal, with four stakeholders reporting low costs.

When asked to provide an estimate of the yearly monetary costs or time spent per year, ten of the 13 respondents provided a response. For costs related to ensuring information exchange with IWT sector with the existing tools, one stakeholder responded EUR 150,000, one approximately EUR 1 million, one approximately EUR 1,6 million and one EUR 250. For the use of the RIS COMEX information portal, one stakeholder responded EUR 39,000, one EUR 90,000 and one EUR 150,000. Two stakeholders reported lower costs, with one responding EUR 300 and one approximately EUR 1,100. For costs related to adhering to the technical standards of the RIS Directive, three stakeholders reported the costs to be between EUR 100,000 and EUR 125,000. One stakeholder reported lower costs (EUR 500) and one EUR 5,000. For yearly costs related to obligations regarding operational traffic management, one stakeholder reported EUR 200,000, one EUR 700,000 and one approximately EUR 4 million. Although the highest costs for administration were reported to be in relation to the creation of a new Competent Authorities, the estimates provided by two stakeholders were lower compared to some of the other areas: one stakeholder responded between EUR 50,000 and EUR 150,000 depending on the scale of the Competent Authority, and one responded EUR 1 million.

Overall, the countries that reported high costs across the six areas are Belgium and Ireland. Ireland reported high costs in all six areas, and Belgium in all but obligations regarding operational traffic management where it reported no costs. Germany on the other hand reported high costs in this area, in addition to high costs related to the creation of new Competent Authorities. Poland also reported high costs for the creation or set-up of a new Competent Authorities, and Austria reported high costs for obligations regarding operational traffic management.

When asked how the estimates had been calculated, only three responses were obtained. One stakeholder responded that the estimates were calculated based on the yearly budget of the maintenance contracts of the region. One stakeholder reported that the estimate regarding information exchange refers to the production of NtS and the information regarding the traffic regulations in the IENCs. One stakeholder responded that the estimates for obligations regarding operational traffic management and information exchange with IWT sector were calculated by dividing the related costs of RIS operation (personnel, SW-maintenance, hosting, network) between the two.

Figure 17: Are there any parts of your current work (or the work of your members) which have improved thanks to the RIS Directive? (n=26)

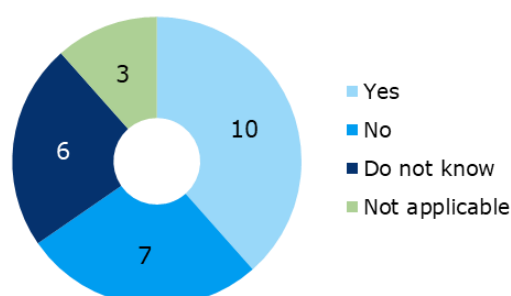


Figure 17 presents the results of stakeholders being asked whether there are any parts of their current work or the work of their members which have improved thanks to the RIS Directive. Out of the total of 26 respondents, 10 stakeholders considered that parts of their

work had improved and seven argued there had been no improvements, while six responded that they did not know.

When asked to specify what had improved, two stakeholders mentioned AIS and having information of other vessels' estimated location, two stakeholders mentioned improved planning, one stated that BICS software is easy to use and saves time and one stakeholder mentioned implementation of quayside reservations through RPIS. In terms of estimations of time or costs saved, one stakeholder responded 0,5 FTE, while three stated no costs saved but their work has improved in terms of having more accurate information available and having improved efficiency and safety.

Figure 18: To what degree do you consider that your authority complies with the recent PIANC (The World Association for Waterborne Transport Infrastructure) RIS guidelines? (n=12)

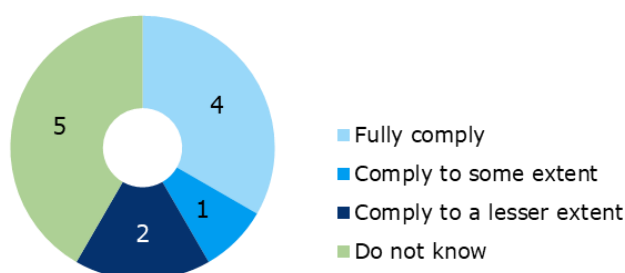


Figure 18 presents the results of stakeholders being asked to what degree they consider that their authority complies with the recent PIANC RIS guidelines. Four out of the total of 12 respondents considered that their authority fully complies, while two were of the opinion that they complied to a lesser extent and five stakeholders responded that they did not know. When asked to describe why their authority may not fully comply with the guidelines, two stakeholders responded stating that national law does not regulate all the PIANC RIS guidelines.

Feedback on the draft policy measures

This section of the survey looked at the stakeholders' views in relation to policy measures which are being assessed under this study. The questions are structured by presenting the policy measures in relation to the problem driver they intend to address.

Figure 19: To what extent do you believe the individual measures below could help to address problem driver 1? (n=49)

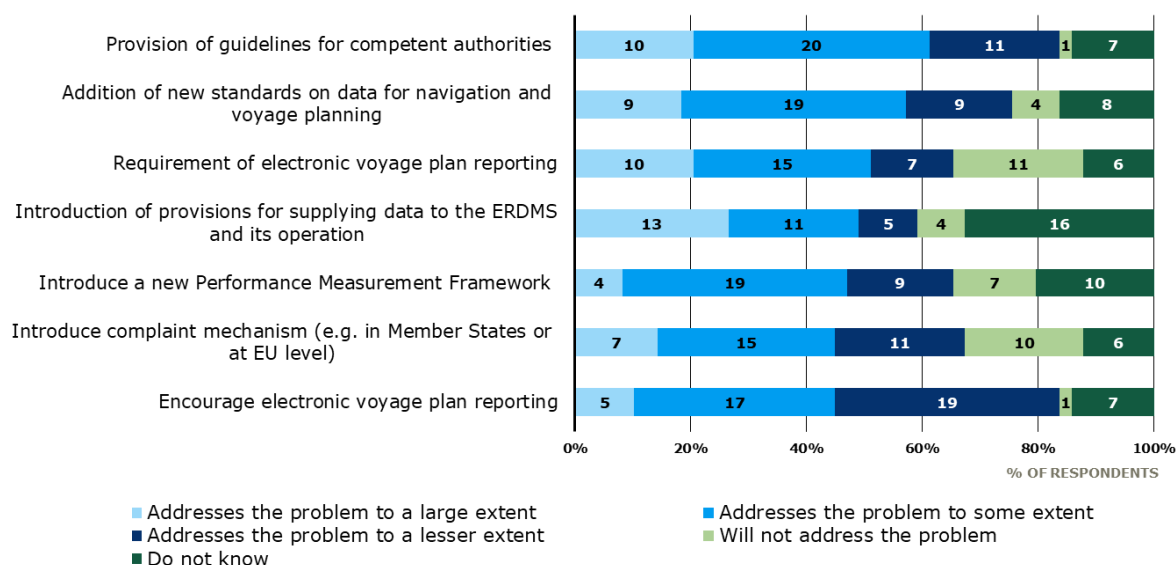


Figure 19 presents the stakeholder responses for the extent to which they believe that the individual measures could help to address problem driver 1 (missing and non-harmonised RIS information hampers efficient and safe navigation). The least helpful measures were encouraging electronic voyage plan reporting, with 19 stakeholders stating that it addresses the problem to a lesser extent, and introducing complaint mechanisms, with 11 stakeholders stating that it addresses the problem to a lesser extent and 10 stating that it will not address the problem. The three measures that were believed to address the problem to a large extent were introduction of provisions for supplying data to the ERDMS and its operation (13 responses), requirement of electronic voyage plan reporting (10 responses) and provision of guidelines for competent authorities (10 responses).

When asked if the respondents believed there to be any additional measures that could be implemented to help address problem driver 1, responses were obtained from 11 stakeholders. Two stakeholders⁴⁰ stated that the RIS index should be clearly defined from a legal point of view, and one respondent⁴¹ stated that measures should be put in place to increase cybersecurity. One stakeholder⁴² stated that it would be beneficial if the RIS Directive also referred to systems like EURIS and CEERIS and made the connection to these systems mandatory or at least encouraged it. One stakeholder⁴³ mentioned that standardisation prior to renewal should be endorsed, and one⁴⁴ stated that a clear agreement should be made within the EU mobility dataspace to address reluctance with regard to standardised data exchange. Three stakeholders didn't consider there to be additional measures that could be implemented to help address the problem driver.

Figure 20: To what extent do you believe the individual measures below could help to address problem driver 2? (n=48)

⁴⁰ International level public bodies

⁴¹ National level public body

⁴² National level public body

⁴³ Inland Waterway Transport/ RIS user

⁴⁴ National level public body

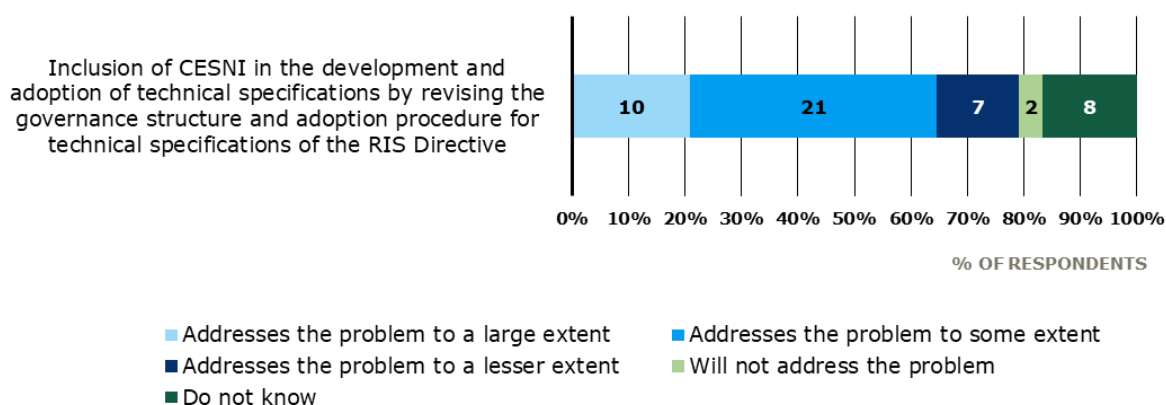


Figure 20 presents the stakeholder responses for the extent to which they believe the individual measure, i.e. inclusion of CESNI in the development and adoption of technical specifications by revising the governance structure and adoption procedure for technical specification of the RIS Directive, could help to address problem driver 2 (inefficient processes for creating and implementing technical specifications for River Information Services). Out of the total of 48 respondents, 31 stakeholders believed that the measure could help to address the problem either to a large extent (10 respondents) or to some extent (21 respondents). Only two stakeholders believed that the measure would not address the problem.

When asked if the respondents considered there to be any additional measures that could be implemented to help address the problem, responses were obtained from 10 stakeholders. Four stakeholders⁴⁵ stated that CESNI standards should be implemented more efficiently and with less administrative procedures in the EU institutions as the current process is too complicated. Two stakeholders⁴⁶ stated that the revised RIS Directive should refer to ES-RIS, and that the date and duration of the implementation of a new edition of ES-RIS should be defined in advance so that all stakeholders can plan accordingly. One stakeholder⁴⁷ responded that clear guidance, support and enforcement measures should be set up for adopting new standards to ensure consistency. One stakeholder didn't consider there to be additional measures that could be implemented to help address the problem driver, and one stakeholder responded that they did not know.

Figure 21: To what extent do you believe the individual measures below could help to address problem driver 3? (n=48)

⁴⁵ Two national level public bodies, one international level public body, and one RIS software/ systems developer

⁴⁶ International level public bodies

⁴⁷ Private association

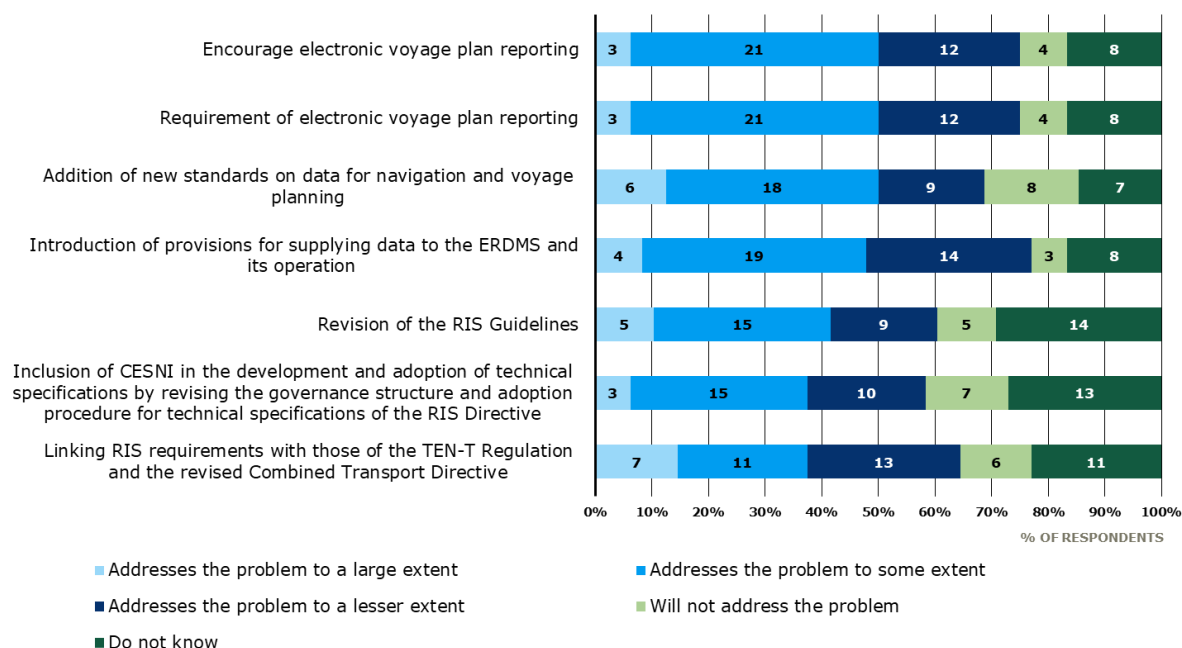


Figure 21 presents the stakeholder responses for the extent to which they believe the individual measures help to address problem driver 3 (River Information Services do not support the integration of inland waterways transport into multimodal supply chains (supporting modal shift)). Out of the seven measures, three were believed to help to address the problem either to a large extent or to some extent by approximately half of the total of 48 respondents. These measures were addition of new standards on data for navigation and voyage planning, requirement of electronic voyage plan reporting and encouraging electronic voyage plan reporting. Including CESNI in the development and adoption of technical specifications and linking RIS requirements with those of the TEN-T Regulation and the revised Combined Transport Directive were found to be the least helpful measures.

When asked if the respondents believed there to be any additional measures that could be implemented to help address the problem, responses were obtained from six stakeholders. One stakeholder⁴⁸ suggested to make use of VDES, and one⁴⁹ stated that a requirement for electronic voyage plan reporting would have to be restricted to certain types of vessels and transports. One stakeholder⁵⁰ highlighted that a clear coherence within a European framework is lacking and a role within a larger EU governance story would offer a long-term solution. Two stakeholders didn't consider there to be any additional measures that could be implemented to help address the problem driver.

⁴⁸ Private sector company

⁴⁹ National level public body

⁵⁰ National level public body

Figure 22: To what extent do you believe the individual measures below could help to address problem driver 4? (n=48)

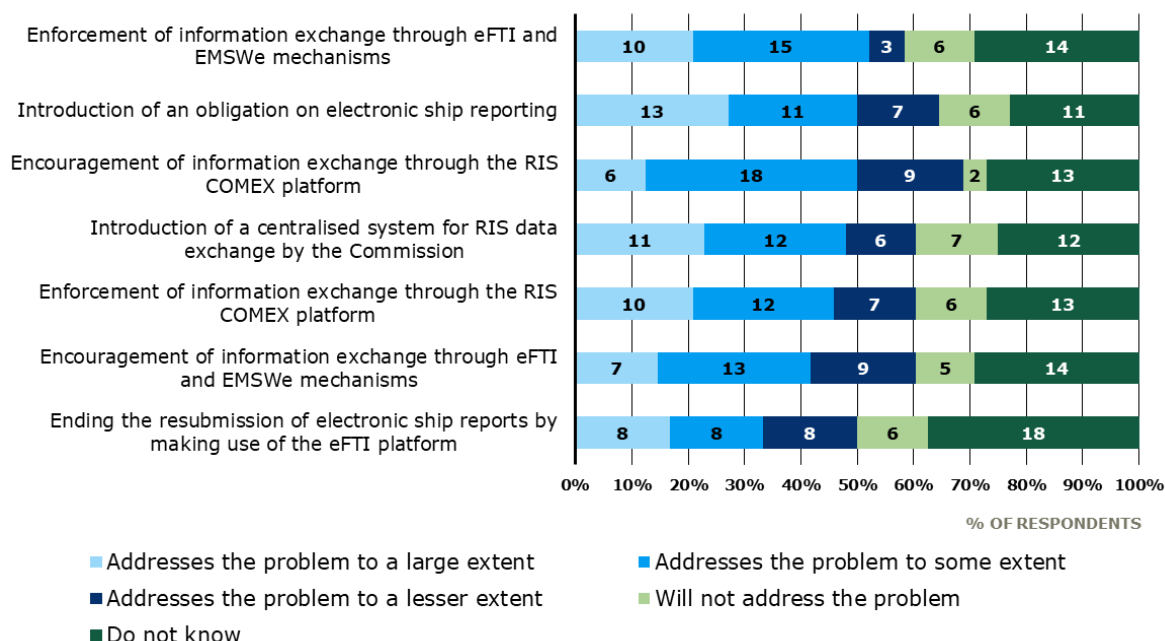


Figure 22 presents the stakeholder responses for the extent to which they believe the individual measures could help to address problem driver 4 (inefficient exchange of information (including cross-border) and reporting). Out of the seven measures, three were believed to help to address the problem either to a large extent or to some extent by approximately half of the total of 48 respondents. The least helpful measures were found to be ending the resubmission of electronic ship reports by making use of the eFTI platform, and encouraging information exchange through eFTI and EMSWe mechanisms, for which 14 stakeholders believed they either addressed the problem to a lesser extent or would not address the problem.

When asked if the respondents considered there to be any additional measures that could be implemented to help address the problem, responses were obtained from 12 stakeholders. Two stakeholders⁵¹ stated that eFTI platforms cannot be a solution to problem driver 4 because they are not reliable enough to provide information on the transport of dangerous goods and they are not designed for safety purposes. Two stakeholders⁵² mentioned that electronic reporting is mainly intended for safety purposes while eFTI is cargo-related and they do not share the same objective. One stakeholder⁵³ highlighted that with regard to eFTI, a stepwise approach would be useful instead of covering all domains with the first draft of a new initiative. Two stakeholders did not consider there to be additional measures that could be implemented to help address the problem driver.

⁵¹ International level public body, national level public body

⁵² International level public bodies

⁵³ National level public body

Figure 23: To what extent do you believe the individual measures below could help to address problem driver 5? (n=46)

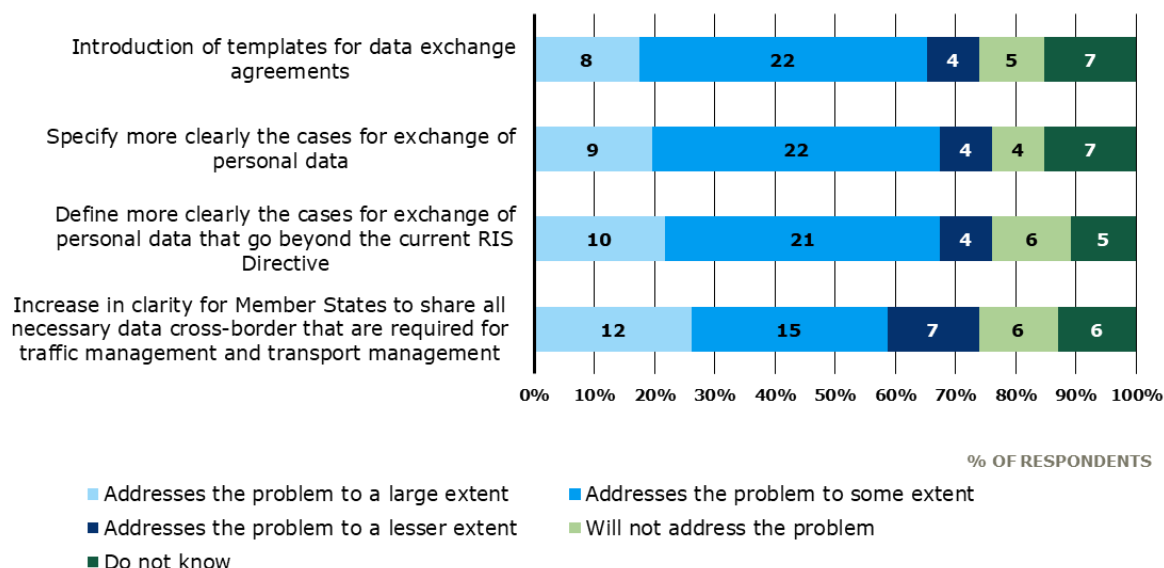


Figure 23 presents the stakeholder responses for the extent to which they believe the individual measures could help to address problem driver 5 (data protection concerns by the inland waterway stakeholders). There was no significant variation between the usefulness of the measures, with three of them believed to address the problem either to a large extent or to some extent by 30-31 out of the total of 46 respondents. Increasing the clarity for Member States to share all necessary data cross-border that are required for traffic management and transport management was found to be slightly less helpful in addressing the problem, with 27 stakeholders believing it to address the problem either to a large extent or to some extent and seven stakeholders believing it to address the problem to a lesser extent.

When asked if the respondents considered there to be any additional measures that could be implemented to help address the problem, responses were obtained from six stakeholders. One stakeholder⁵⁴ mentioned allowing ship owners or skippers to share AIS data for purposes other than navigation, and another stakeholder⁵⁵ suggested to adapt to the many initiatives taken by DG MOVE and DG CONNECT within a broader scope of an EU mobility data space instead of developing new initiatives. Two stakeholders⁵⁶ mentioned that the measures to be taken to address problem driver 5 are relative to the GDPR itself, and one⁵⁷ stated that all official ECDIS charts should be served at one EU server. One

⁵⁴ Inland Waterway Transport/ RIS user

⁵⁵ National level public body

⁵⁶ International level public bodies

⁵⁷ Inland Waterway Transport/ RIS user

stakeholder did not consider there to be additional measures that could be implemented to help address the problem driver.

Overall, the proposed measures were found to be the most useful in addressing problem drivers 2 and 5, with approximately 60-65% of the stakeholders believing the individual measures help to address the problem driver either to a large extent or to some extent. The measures which were considered the least efficient included ending the resubmission of electronic ship reports by making use of the eFTI platform for problem driver 4 and linking RIS requirements with those of the TEN-T Regulation and the revised Combined Transport Directive for problem driver 3, with only approximately 35% of the stakeholders stating that they helped to address the problem to a large extent or to some extent. The findings regarding the least efficient measures differ somewhat from the Mentimeter polling from the expert group where the participants had ranked the measure for problem driver 4 as the third most relevant measure and for problem driver 3 as the fifth relevant measure for addressing the problem driver. It should however be noted that the measures for problem drivers 4 and 5 were polled as one, and the number of participants was much lower (22-24) compared to the survey.

3. Stakeholder Survey 2 Analysis

The purpose of this survey was to gain an understanding of the stakeholder views on the costs and benefits of each of the proposed policy measures. The survey was distributed to 229 stakeholders, of which 9 have completed it and 10 have partially completed it (i.e. started completing the survey but did not answer all questions) at the time of the analysis. The 9 partially completed answers covered at least the profiling and potential impacts questions and were thus considered in the analysis for the questions where answers have been provided. In line with the Better Regulation Guidelines and Toolbox, the survey data was assessed for any entries that may be incomplete, contain duplicates, or contain errors. As such, each graph provides the number of responses per answer question.

The survey is structured and presented across five key areas:

- Profiling
- Potential costs of proposed policy measures
- Potential benefits of proposed policy measures
- Potential environmental/ social impacts of proposed policy measures
- Closing questions

Profiling questions

To start, respondents were asked a series of profiling questions, specifying which country they primarily work in and which stakeholder category they belong to. This information is useful in that it helps to identify any correlations or differences between responses and stakeholder categories, which will aid the triangulation of data in the final analysis phase of this study.

Figure 24: Which country do you primarily work in? (n=13)

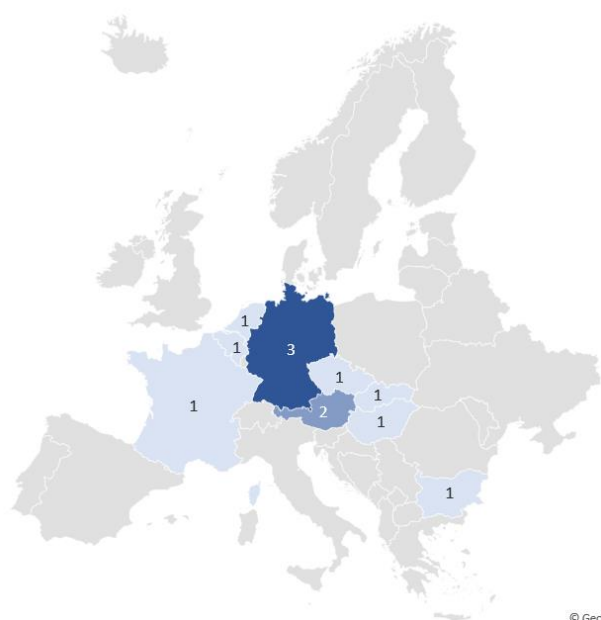


Figure 23 presents the geographical scope of the countries where the stakeholders primarily work in. The highest number of stakeholders work primarily in Germany (3 respondents), followed by Austria (2 respondents). In addition, two stakeholders responded working for more countries than one, with one stakeholder working for an international organisation whose headquarter is in France, and one working across Europe.

Figure 25: Which stakeholder category best describes you? (n=13)

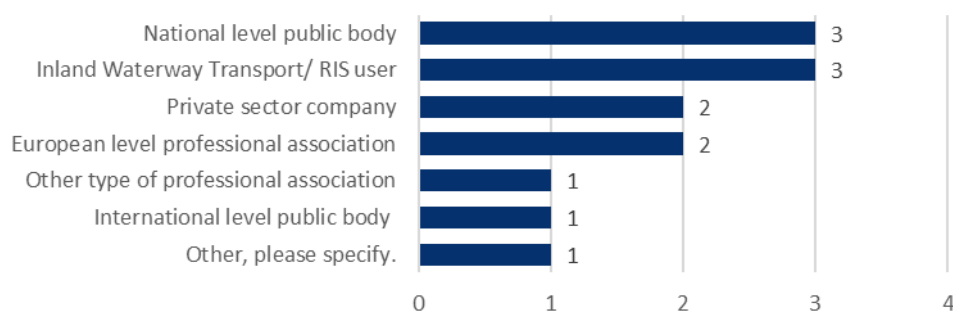


Figure 24 presents the stakeholder categories of the respondents. The majority of the respondents are either national level public bodies (3 respondents) or inland waterway transport or RIS users (3 respondents). One stakeholder chose "other type of professional association" and responded as a IWT operator for fleet and ports; whilst one stakeholder chose "other" and responded as a RIS operator.

Figure 26: Please specify below which sector(s) your association/ organisation represents.(n=3)

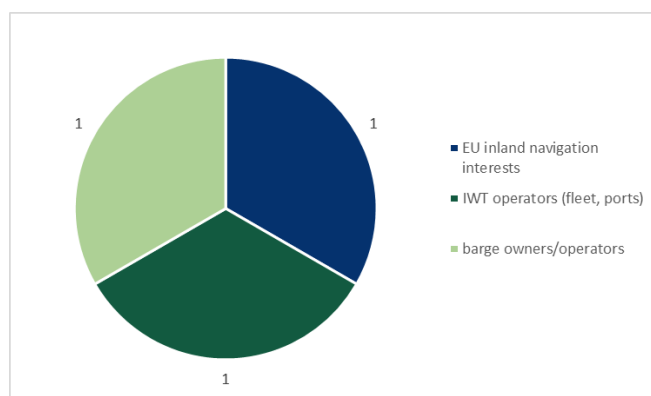


Figure 25 presents the sectors represented by the organizations of those who responded “European level professional association” or “Other type of professional association” to the question above. One of the two respondents working in a European level professional association works in EU inland navigation interests, whilst the other respondent works in the sector of barge owners/operators. The respondent working in another type of professional association works in the sector of IWT operators (fleet, ports). The two respondents who identified their stakeholder category as “private sector company” were similarly asked to disclose their specific stakeholder category. One of them works as a RIS Technology provider, whilst the other one operates a tanker fleet.

Figure 27: Please indicate which specific stakeholder category you belong to. (n=4)

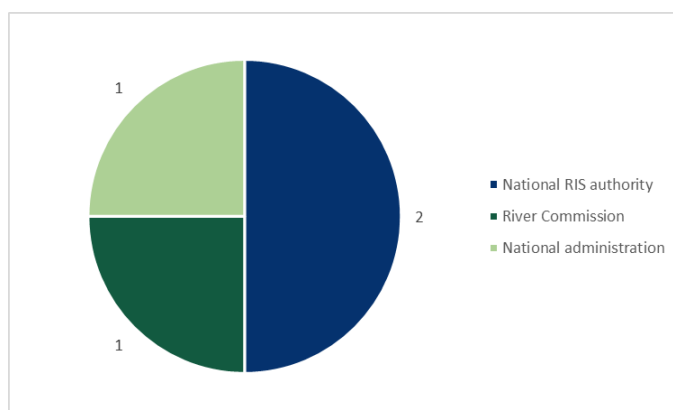


Figure 26 presents the specific stakeholder category for those who responded, “national level public body”, “EU level public body” or “international level public body” as their stakeholder category. Two out of three respondents working in a national level public body work as National RIS authorities, whilst the third respondent works in a national administration. The only respondent working for an international level public body works for a River Commission.

Figure 28: Which specific type of specific stakeholder do you operate as? (n=3)

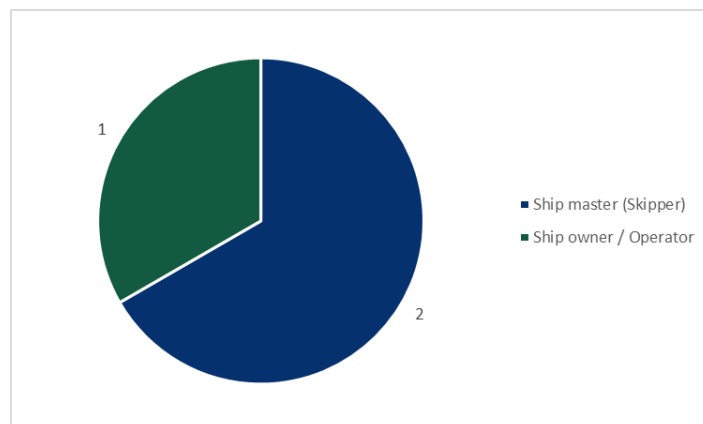


Figure 27 presents the specific stakeholder category for those who responded “IWT/RIS user” as their stakeholder category. Two respondents work as ship masters (skippers), and one works as a Ship owner/operator.

Figure 29: How many employees does your organisation have? (n=5)

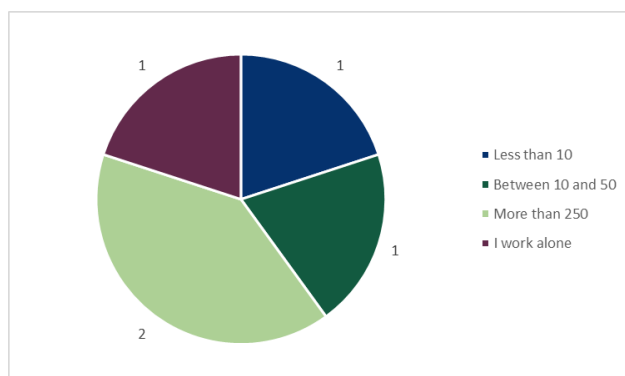


Figure 28 presents the number of employees for each of the organisations of respondents who identified their stakeholder category as “IWT/RIS user” or “private sector company”. Two respondents work in an organisation with more than 250 employees, whilst the remaining three respondents work, respectively, alone, in an organisation with less than 10 employees and in an organisation with between 10 and 50 employees.

Figure 30: How many members/businesses does your organisation/association represent? (n=3)

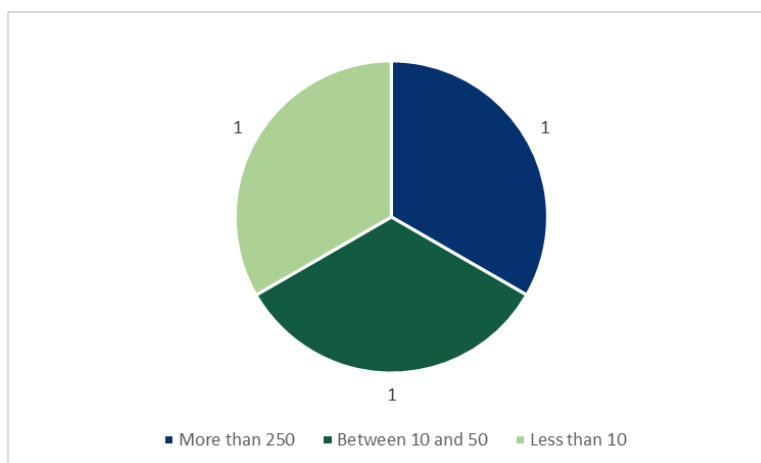


Figure 29 presents the number of members/businesses employees for the each of the organisations/associations of respondents who identified their as “representative organisation’. One respondent works in an organisation representing more than 250 members/businesses, one respondent works in an organisation representing between 10 and 50 members/businesses whilst the last respondent works in an organisation representing less than 10 members/businesses.

Potential costs of proposed policy measures

This section of the survey looked at the proposed policy measures which were identified in the study, asking participants to provide insights and estimations of the types and magnitude of costs (i.e. administrative, adjustment, hassle and indirect costs) and benefits that may be brought as a result of each of the measures.

Measure 1: Encourage cargo related information exchange through eFTI mechanisms

Table 1 presents the type and amount of costs related to the introduction of Measure 1. Out of 13 respondents, 9 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 21-50% of administrative costs, adjustment costs, hassle costs and indirect costs per action. The respondent from the private sector company did not find any change in costs, whilst the respondents from the RIS operator and the national level public body found almost opposite increases and decreases for different types of costs.

Table 4: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n= 4)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanation of % change	Additional information/estimates in relation to this measure.
RIS operator	Decrease by 21-50%	Man hours can be reduced.	No change	-	Decrease by 1-20%	-	Decrease by 1-20%	-	-
International level public body	Increase by 21-50%	-	Increase by 21-50%	-	Increase by 21-50%	-	Increase by 21-50%	-	eFTI is not mandatory for the boat master. Electronic Reporting is mandatory (in some circumstances). Electronic Reporting also target passenger vessels, which is not planned by eFTI regulation.
Private sector company	No change	-	No change	-	No change	-	No change	-	As we are not directly involved in encouraging cargo related information exchange through eFTI mechanisms, the answers have been "No change". My best guess as not effected entity would be as follows: Administrative costs per action: increase by 1-20% (this will be more likely a single investment) Adjustment costs per action: increase by 1-20% (this will be more likely a single investment) Hassle costs per action: "no change" Indirect costs per action: "no change".
National level public body	Increase by 1-20%	Not obligatory use of eFTI leads to double procedures - both for traditional means and for eFTI means.	Increase by 21-50%	There is necessary to implement technologies, which could be reduced by sharing solutions by more countries.	Decrease by 1-20%	There could be reduced time for solving of incorrect data input and sharing data with other purposes.	-	-	This is a rough estimation for the authority point of view. For IWT users (skippers, fleet operators) it could be beneficial, but there is strong necessity that real use of eFTI will not only be about procedure, but also about data standardisation - same digital data format for bill of lading, ERI message, message to maritime port etc.

Measure 2: Enforce information cargo related exchange of all RIS-information through eFTI mechanisms

Table 2 presents the type and amount of costs related to the introduction of Measure 2. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the RIS operator found a consistent decrease by 1-50% in administrative, hassle and indirect costs per action. The respondent from the international level public body found a consistent increase by 51-100% of administrative costs, adjustment costs, hassle costs and indirect costs per action.

Table 5: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n= 3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
RIS operator	Decrease by 21-50%	-	No change	-	Decrease by 1-20%	-	Decrease by 21-50%	-	Man hours
International level public body	Increase by 51-70%	-	Increase by 71-100%	Mandatory implies far more discussions and meetings.	Increase by 71-100%	Mandatory = More procedures and validation / coordination procedure	Increase by 51-70%	Mandatory implies more complaints and more questions.	eFTI would become mandatory for inland navigation while it is not in general. This would lead to legal issues.
National level public body	Decrease by 51-70%	Reduction of maintenance and operational cost for parallel solutions.	Increase by 21-50%	The same as for optional use of eFTI.	Decrease by 21-50%	Higher possible reduction of costs by pure digital reporting.	-	-	The same prerequisite for digital data standardisation, which is necessary for real reduction of administrative burden by single reporting not only in IWT, but also multimodal.

Measure 3: Enforce information exchange through the RIS COMEX platform

Table 3 presents the type and amount of costs related to the introduction of Measure 3. Out of 13 respondents, 11 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the private sector company only reported a decrease in administrative costs per action, whilst the respondent from the national level public body found a consistent decrease by 1-50% for administrative, adjustment and hassle costs per action.

Table 6: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n= 2)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
Private sector company	Decrease by 1-20%		No change		No change		No change		
National level public body	Decrease by 1-20%	Reduction of effort by use the same environment with same procedures for comparable tasks.	Decrease by 1-20%	Reduction of costs for operation of similar environment on national level.	Decrease by 21-50%	On the IWT user side by single access to data.			There is necessary to finance costs for operation of the RIS COMEX information platform, but the national share of costs will be significantly lower in comparison with separated national solution. There must be underlined that such estimation is relevant only for the same level of provided service, because RIS COMEX platform provides wider range of services than any national services before.

Measure 4: Increase level of harmonisation of RIS by providing guidelines for competent authorities

Table 4 presents the type and amount of costs related to the introduction of Measure 4. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 1-20% for adjustment, hassle and indirect costs per action, the whilst the respondent from the public level body found a consistent decrease by 1-20% of administrative, adjustment and hassle costs.

Table 7: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n= 3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	No change	Already in the work-programme of CESNI.	Increase by 1-20%	Guidelines need to be drafted / translated / reviewed.	Increase by 1-20%	Validation processes for publishing guidelines.	Increase by 1-20%	Maintenance of the content, printing costs.	Guidelines are always useful.
Private sector company	Decrease by 1-20%	-	No change	-	No change	-	No change	-	-
National level public body	Decrease by 1-20%	Administrative costs could be reduced by more efficient procedures, with benefits of sharing of win-win solutions.	Decrease by 21-50%	Higher standardisation leads to avoiding of additional costs for dealing with same issues on national level and solving of incompatibility issues.	Decrease by 1-20%	On IWT users by better information quality which fulfils user needs by digital services and additional quality which reduce language and administrative burden etc.	-	-	Clear and fluent harmonisation leads to more efficient production circle of services and reduction of costs for fixing of issues in services in the case of limited standardisation. Significant benefits are on the user side by better user-fit applications and solutions with no-border differences of provided services.

Measure 5: Require electronic voyage reporting

Table 5 presents the type and amount of costs related to the introduction of Measure 5. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 1-70% for administrative, adjustment, hassle and indirect costs per action.

Table 8: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 51-70%	Costs for Administration and the sector.	Increase by 1-20%	ERIVROY is ready but would need adjustments (or a new message).	Increase by 51-70%	This measure would require a lot of discussion and coordination.	Increase by 21-50%	Leaflet to be developed, communication, answering questions.	A new electronic reporting message may need to be developed if an existing one is not fit for purpose.
Private sector company	-	-	-	-	-	-	-	-	As this cannot be that huge amount of effort, I believe the involved costs are neglectable (a few minutes per journey which can be done at any uncritical moment in time).
National level public body	Decrease by 1-20%	Reduction of paperwork on the skipper side, reduction of manual work on RIS centre side by automatic processing of reporting.	Increase by 1-20%	Slight increase by necessity to use new application and cover related costs. It could be reduced by free-of-charge and simple services provided by public sector especially to SME's.	Decrease by 1-20%	Possible quicker processing of smart digital reporting, especially when it will be done only ones per voyage.	-	-	-

Measure 6: Strengthen requirements for RIS standards by adding new standards on data for navigation and voyage planning (RIS Index) and new provisions that contribute to increased efficiency

Table 6 presents the type and amount of costs related to the introduction of Measure 6. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 1-20% for adjustment, hassle and indirect costs per action, whilst the respondent from the national level public body found a consisted decrease by 21-50% for administrative and hassle costs per action.

Table 9: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	No change	-	Increase by 1-20%	Still quite some work to do before it is achieved.	Increase by 1-20%	Coordination with EuRIS.	Increase by 1-20%	Maintenance cost and questions.	CESNI could be mandated to publish such a standard on data for navigation and voyage planning. This would for sure contribute to the harmonisation of RIS.
Private sector company	-	-	-	-	-	-	-	-	See the answer to Measure 5; this cannot be that huge amount of effort.
National level public body	Decrease by 21-50%	Higher standardisation enables more clear identification and provision of information by single mean, including reduction of effort for solving of unclear issues to reach compatibility of services.	No change	Higher level of standards needs costs to fit current services to standardised level. In contrary higher standardisation reduces costs for parallel different solutions and additional effort.	Decrease by 1-20%	Significant reduce of time by connecting solutions cross-border and quicker production and distribution of standardised data.	-	-	-

Measure 7: Introduce provisions for supplying data to the ERDMS and its operation

Table 7 presents the type and amount of costs related to the introduction of Measure 7. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 1-20% for adjustment, hassle and indirect costs per action.

Table 10: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 1-20%	-	No change	-	Increase by 1-20%	-	Increase by 1-20%	Operational work on the data necessary from time to time.	ERDMS should become the reference database of IWT. Link with EuRIS and CESNI should be established.
Private sector company	No change	-	No change	-	No change	-	No change	-	-
National level public body	-	-	-	-	-	-	-	-	ERDMS as a single mean for provision of reference data is beneficial especially for client applications provided by SW manufacturers, which could use single source of official reference data.

Measure 8: Link RIS requirements with those of the TEN-T Regulation and the revised Combined Transport Directive

Table 8 presents the type and amount of costs related to the introduction of Measure 8. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 51-70% for administrative, adjustment, hassle and indirect costs per action.

Table 11: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 51-70%	-	Increase by 51-70%	-	Increase by 51-70%	-	Increase by 51-70%	-	Costs may rise as additional requirements or good navigation principle may increase the number of information to be made available.
Private sector company	No change	-	Increase by 1-20%	Minor increase due to the need for legislation cross checks.	No change	-	No change	-	-
National level public body	-	-	-	-	-	-	-	-	Such measure should not provide significant additional costs for authorities, especially in the field of IWT sector. Mandatory provision of RIS services with certain level of quality linked with Good Navigation Status provides benefits for IWT users, who will have better information services and could reduce administrative burden in transshipment operations and increase reliability of logistic operations. There could be costs on the terminal operators and other parties side who will have to adjust their services to compatible ones.

Measure 9: Develop new standards and technical specifications for the exchange of information relating to IWT ports

Table 9 presents the type and amount of costs related to the introduction of Measure 9. Out of 13 respondents, 11 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 1-50% for administrative, adjustment, hassle and indirect costs per action.

Table 12: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=2)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/ estimates in relation to this measure.
International level public body	Increase by 21-50%	-	Increase by 21-50%	-	Increase by 1-20%	Coordination with IWT ports (and maritime sector).	Increase by 1-20%	New input, maintenance of the standards.	CESNI may play a role in the definition of the standards. Standards at the interface shore/vessel are complex to draft.
National level public body	Decrease by 1-20%	Provision of possibility to exchange standardised digital data could make digital services more attractive for users and furthermore reduce cost of traditional administrative procedures.	No change	Fixing of current services to new standards will need additional costs, in contrary standardised solutions could be cheaper than pure custom solutions	-	-	-	-	-

Measure 10: Mandate new standards and technical specifications for the exchange of information relating to IWT ports

Table 10 presents the type and amount of costs related to the introduction of Measure 10. Out of 13 respondents, 11 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 71-100% for administrative, adjustment, hassle and indirect costs per action. The respondent from the national level public body found a decrease by 1-50% for administrative and hassle costs per action.

Table 13: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=2)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanation of % change	Additional information/ estimates in relation to this measure.
International level public body	Increase by 71-100%	Mandatory = more focus, more bodies involved.	Increase by 71-100%	Mandatory implies more discussions, more documents	Increase by 71-100%	Mandatory implies more demands and more constraints.	Increase by 71-100%	Mandatory implies more questions and more energy	This measure is too strong and is going too far, going from nothing to mandatory requirements. This measure would require a lot of efforts.
National level public body	Decrease by 21-50%	Mandatory use of digital form reduces costs for parallel solutions (traditional and digital) and could enable automatic processing of digital data.	Increase by 1-20%	Slight increase on IWT user side, because they will need to be able to use digital reporting platforms. It could be significantly reduced and acceptance by users could increase by provision of simple cheap common public services.	Decrease by 1-20%	Reduction of time by processing of administrative burden.	-	-	-

Measure 11: Oblige Member States to share cross-border all necessary data that are required for traffic management and transport management

Table 11 presents the type and amount of costs related to the introduction of Measure 11. Out of 13 respondents, 11 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found a consistent increase by 21-70% for administrative, adjustment, hassle and indirect costs per action. The respondent from the national level public body found a decrease by 21-50% for hassle costs per action.

Table 14: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=2)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 21-50%	Mandatory means more committees involved.	Increase by 21-50%	Inclusion of "private sector stakeholders" require lot of work.	Increase by 51-70%	Hassle to coordinate all MS.	Increase by 21-50%	Maintenance of the underlying standard and questions.	It would be a good idea to harmonize the data-format for cross-border exchanges. But making mandatory exchange of data is one step too much.
National level public body	-	-	-	-	Decrease by 21-50%	significant reduction of costs and effort on IWT users by single reporting, including maritime ports.	-	-	On the side of authorities, it is necessary to establish data exchange technologies, but such costs are more or less only ones and operation of cross-border data exchange is cheap.

Measure 12: Involve CESNI in the development and adoption of technical specifications by revising the governance structure and adoption procedure for technical specifications of the RIS Directive

Table 12 presents the type and amount of costs related to the introduction of Measure 12. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found an increase by 1-20% for hassle and indirect costs per action, whilst the respondent from the national level public body found a decrease by 1-20% for administrative and hassle costs per action.

Table 15: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/ estimates in relation to this measure.
International level public body	No change	-	No change	-	Increase by 1-20%	More coordination between CCNR and EC.	Increase by 1-20%	Paperwork, internal coordination etc.	This measure is ready to be enforced.
Private sector company	Increase by 1-20%	Due to the standard development activities ~ 8 man- days per year.	No change	-	No change	-	No change	-	-
National level public body	Decrease by 1-20%	Quicker adoption of new standards with simplified procedures reduces costs for processing of harmonisation procedures	-	-	Decrease by 1-20%	Smooth reaction of standardisation to new challenges and technical development of smart technologies.	-	-	-

Measure 13: Introduce complaint mechanism (in Member States) to ensure a higher degree of harmonisation for RIS

Table 13 presents the type and amount of costs related to the introduction of Measure 13. Out of 13 respondents, 11 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found an increase by 51-100% for administrative, adjustment and hassle costs per action, whilst the respondent from the national level public body found a decrease by 1-20% for administrative and hassle costs per action.

Table 16: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=2)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 71-100%	No mechanism exists at EU level.	Increase by 51-70%	-	Increase by 71-100%	Cost of coordination and conflicts of competency.	Increase by 71-100%	Consultancy to handle the conflict of competency.	-
National level public body	Increase by 1-20%	Costs for processing of complains, significant needs to provide more quicker and substantial procedure to maintain data and services and fix issues - it needs more staff and expenditures for ICT suppliers stand-by.	-	-	Decrease by 1-20%	Possible better level of services for IWT end users could reduce their costs.	-	-	-

Measure 14: Introduce a new Performance Measurement Framework

Table 14 presents the type and amount of costs related to the introduction of Measure 14. Out of 13 respondents, 11 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found an increase by 21-100% for administrative, adjustment hassle and indirect costs per action, whilst the respondent from the national level public body found a decrease by 1-20% for administrative costs per action.

Table 17: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=2)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 21-50%	-	Increase by 71-100%	Determine the KPI is quite some work and discussions.	Increase by 51-70%	KPI are always difficult to implement and cause delays.	Increase by 1-20%	Maintenance of the KPI	It's always useful to have KPIs, but this can lead to a lot of complexity. Monitoring the implementation of standards (availability of charts, ERI data exchanges between states, availability of NtS announcements, etc.), is simple. Something smarter is an open door to endless debates.
National level public body	Decrease by 1-20%	Processing of analysis of technical specifications and related key performance indication.	-	-	-	-	-	-	-

Measure 15: Improve harmonisation between RIS and information services for other modes of transport (e.g. maritime)

Table 15 presents the type and amount of costs related to the introduction of Measure 15. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. For the remaining respondents, the respondent from the international level public body found an increase by 21-70% for administrative, adjustment hassle and indirect costs per action, whilst the respondent from the national level public body found a decrease by 1-20% for administrative and hassle costs per action.

Table 18: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanations of % change	Additional information/ estimates in relation to this measure.
International level public body	Increase by 51-70%	More standards, more work.	Increase by 51-70%	-	Increase by 51-70%	Coordination with other sectors.	Increase by 21-50%	Monitoring all development in other sector.	-
Private sector company	Increase by 1-20%	Probably about additional 8 days per year to observe and contribute.	No change	-	No change	-	No change	-	-
National level public body	Decrease by 1-20%	On IWT users side reduction of administrative burden and necessity to use different applications for reporting to different maritime ports.	-	-	Decrease by 1-20%	Reduction of time for administrative burden on IWT side by single reporting.	-	-	-

Measure 16: Specify more clearly the cases for the exchange of personal data

Table 16 presents the type and amount of costs related to the introduction of Measure 16. Out of 13 respondents, 12 respondents were not able to estimate the potential costs of this measure. The respondent from the international level public body found an increase by 1-50% for administrative, adjustment hassle and indirect costs per action.

Table 19: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=1)

Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanation of % change	Additional information/estimates in relation to this measure.
International level public body	Increase by 21-50%	-	Increase by 21-50%	-	Increase by 21-50%	Not a consensual subject, delays and discussions expected	Increase by 1-20%	-	Only if nothing is added to GDPR.

Measure 17: Develop templates and standards for the exchange of personal data

Table 17 presents the type and amount of costs related to the introduction of Measure 17. Out of 13 respondents, 10 respondents were not able to estimate the potential costs of this measure. The respondent from the international level public body found an increase by 51-70% for administrative, adjustment hassle and indirect costs per action, whilst the respondent from the national level public body found a decrease by 1-20% for administrative costs per action.

Table 20: What percentage increase/decrease would this measure have on the following categories of costs per action (i.e. per eFTI report)? (n=3)

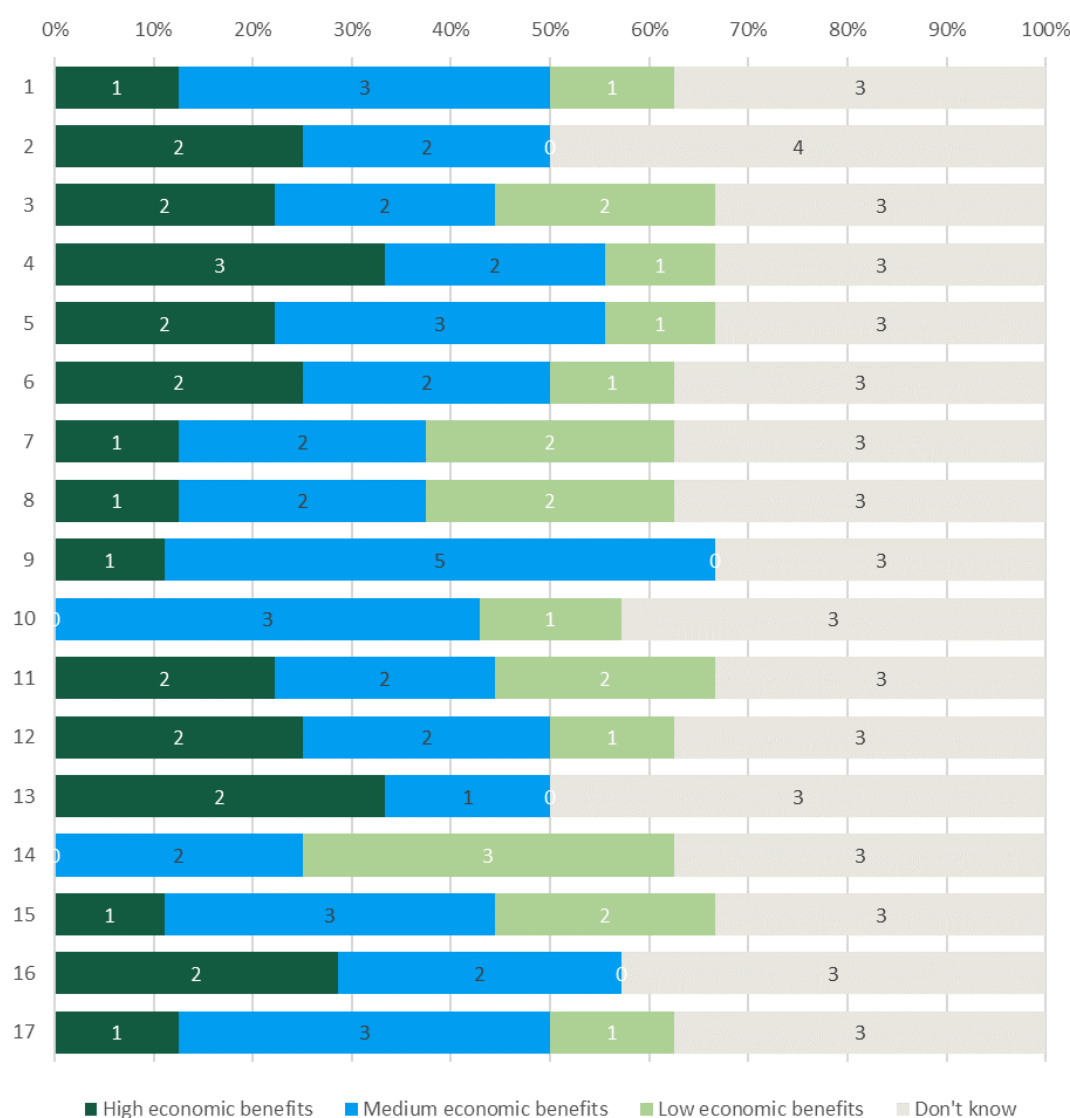
Stakeholder category	Administrative costs per action	Explanation of % change	Adjustment costs per action -	Explanation of % change	Hassle costs per action -	Explanation of % change	Indirect costs per action -	Explanation of % change	Additional information/estimates in relation to this measure.
European level professional association	-	-	-	-	-	-	-	-	I have no insights in costs, but very worried about the privacy issue concerning the use of AIS and RIS. Now already all information on the vessel is publicly available and even being used in a commercial way, without the user of AIS knowing. This in my view is a clear violation of privacy.
International level public body	Increase by 51-70%	-	Increase by 51-70%	-	Increase by 51-70%	GDPR is not consensual, thus it will take time.	Increase by 51-70%	More questions and more clarification necessary for templates	Creating common templates is costly and difficult to achieve for things such as GDPR which interpretation is not consensual.
National level public body	Decrease by 1-20%	Lower costs on RIS authority side to reach necessary level of dealing with personal data.	-	-	-	-	-	-	

Potential benefits of proposed policy measures

This section of the survey asked participants to tick the degree of economic benefits that the proposed policy measures would provide to them or to their organisation.

Measure 4 (Increase level of harmonisation of RIS by providing guidelines for competent authorities) is the policy measure deemed to provide the highest economic benefits, whilst most respondents believe that Measure 13 (Introduce complaint mechanism (in Member States) to ensure a higher degree of harmonisation for RIS) provides no economic benefits at all. Measure 5 (Require electronic voyage reporting) has been deemed by the most respondents as likely to bring medium economic benefits.

Figure 31: What degree of economic benefits (i.e. cost savings) would this measure provide to you/your organisation? (n=8)



Potential environmental/social impacts of proposed policy measures

This section of the survey asked participants to specify the potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through the implementation of the proposed policy measures.

Measure 1: Encourage cargo related information exchange through eFTI mechanisms

Table 18 presents the type of environmental and social impacts that may arise through the implementation of Measure 1. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 1 would result in 0-3% fuel increase, whilst differing opinions are provided on safety, job creation and working conditions/ security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 21: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 1. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Not applicable	Increase in safety	No change	Increase in working conditions/ security
National level public body	Not applicable	No change in safety	Don't know	Increase in working conditions/ security
International level public body	2-3% fuel increase	Decrease in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private sector company	0-1% fuel decrease	Don't know	Don't know	Don't know
National level public body	No change in efficiency gains	Increase in safety	No change	Increase in working conditions/ security

Measure 2: Enforce information cargo related exchange of all RIS-information through eFTI mechanisms

Table 19 presents the type of environmental and social impacts that may arise through the implementation of Measure 2. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 2 would result in 0-3% fuel increase, whilst 5 respondents believe that the measure would provide an increase in working conditions/security. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 22: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 2.(n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Not applicable	Increase in safety	Increase in working conditions/ security	No change
National level public body	Not applicable	Increase in safety	Increase in working conditions/ security	Don't know
International level public body	2-3% fuel increase	Decrease in safety	No change in working conditions/ security	No change
Other type of professional association	No change in efficiency gains	No change in safety	No change in working conditions/ security	No change
Private sector company	0-1% fuel increase	Don't know	Don't know	Don't know
National level public body	Not applicable	Increase in safety	Increase in working conditions/ security	Both creation and loss of jobs

Measure 3: Enforce information exchange through the RIS COMEX platform

Table 20 presents the type of environmental and social impacts that may arise through the implementation of Measure 3. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. One respondent believe that Measure 3 would result in 2-3% fuel increase, whilst differing opinions are provided on safety, job creation and working conditions/ security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 23: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 3. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Not applicable	Increase in safety	No change	No change in working conditions/ security
National level public body	Not applicable	Increase in safety	Don't know	No change in working conditions/ security
International level public body	No change in efficiency gains	Decrease in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Don't know	Don't know	Don't know
National level public body	2-3% fuel decrease	Increase in safety	No change	Increase in working conditions/ security

Measure 4: Increase level of harmonisation of RIS by providing guidelines for competent authorities

Table 21 presents the type of environmental and social impacts that may arise through the implementation of Measure 4. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. One respondent believe that Measure 4 would result in 4-5% fuel increase, 5 respondents believe that the measure would increase safety, whilst differing opinions are provided on job creation and working conditions/ security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 24: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 4.(n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Not applicable	No change in safety	No change	No change in working conditions/ security
National level public body	Not applicable	Increase in safety	Don't know	Increase in working conditions/ security
International level public body	4-5% fuel decrease	Increase in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	Increase in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Increase in safety	No change	Not applicable

Measure 5: Require electronic voyage reporting

Table 22 presents the type of environmental and social impacts that may arise through the implementation of Measure 5. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 5 would result in 0-3% fuel increase, 5 respondents believe that the measure would increase safety and 3 respondents believe that the measure would increase working conditions/security. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 25: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 5.(n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Don't know	Increase in safety	No change	Increase in working conditions/ security
National level public body	Not applicable	Increase in safety	Don't know	Increase in working conditions/ security
International level public body	2-3% fuel increase	No change in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	Increase in safety	No change	No change in working conditions/ security
Private sector company	0-1% fuel decrease	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Increase in safety	Both creation and loss of jobs	Increase in working conditions/ security

Measure 6: Strengthen requirements for RIS standards by adding new standards on data for navigation and voyage planning (RIS Index) and new provisions that contribute to increased efficiency

Table 23 presents the type of environmental and social impacts that may arise through the implementation of Measure 6. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 6 would result in 0-3% fuel increase, 6 respondents believe that the measure would increase safety and 3 respondents believe that the measure would increase working conditions/security. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 26: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 6. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	2-3% fuel decrease	Increase in safety	No change	Increase in working conditions/ security
National level public body	Not applicable	Increase in safety	Don't know	Increase in working conditions/ security
International level public body	No change in efficiency gains	Increase in safety	No change	No change in working conditions/ security
Other type of professional association	0-1% fuel decrease	Increase in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Increase in safety	No change	Increase in working conditions/ security

Measure 7: Introduce provisions for supplying data to the ERDMS and its operation

Table 24 presents the type of environmental and social impacts that may arise through the implementation of Measure 7. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. One respondent believes that Measure 7 would result in 2-3% fuel increase, 4 respondents believe that the measure would increase safety, whilst differing opinions are provided on the job creation and working conditions/ security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 27: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 7. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Not applicable	Not applicable	No change	Not applicable
National level public body	Not applicable	Increase in safety	Don't know	Increase in working conditions/ security
International level public body	2-3% fuel decrease	Increase in safety	Creation of jobs	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	Increase in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Not applicable	No change	Not applicable

Measure 8: Link RIS requirements with those of the TEN-T Regulation and the revised Combined Transport Directive

Table 25 presents the type of environmental and social impacts that may arise through the implementation of Measure 8. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 8 would result in 0-10% fuel increase, two respondents believe that the measure would increase safety, whilst differing opinions are provided on the job creation and working conditions/ security impacts. It should be noted that 4 stakeholders answered that they did not know or that the question was not applicable.

Table 28: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 8.(n=

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European professional association level	5-10% fuel decrease	No change in safety	No change	Not applicable
International public body level	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Other type of professional association	0-1% fuel decrease	No change in safety	No change	No change in working conditions/ security
Private company sector	No change in efficiency gains	Increase in safety	Don't know	No change in working conditions/ security
National level public body	2-3% fuel decrease	Increase in safety	No change	Increase in working conditions/ security

Measure 9: Develop new standards and technical specifications for the exchange of information relating to IWT ports

Table 26 presents the type of environmental and social impacts that may arise through the implementation of Measure 9. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Three respondents believe that Measure 9 would result in 0-3% fuel increase, 3 respondents believe that the measure would increase safety, whilst differing opinions are provided on the job creation and working conditions/ security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 29: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 9.(n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European professional association level	0-1% fuel decrease	Increase in safety	No change	Increase in working conditions/ security
National level public body	Don't know	No change in safety	Don't know	No change in working conditions/ security
International level public body	2-3% fuel decrease	No change in safety	Creation of jobs	No change in working conditions/ security
Other type of professional association	0-1% fuel decrease	Increase in safety	No change	No change in working conditions/ security
Private company sector	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Not applicable	No change	Increase in working conditions/ security

Measure 10: Mandate new standards and technical specifications for the exchange of information relating to IWT ports

Table 27 presents the type of environmental and social impacts that may arise through the implementation of Measure 10. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 10 would result in 0-1% fuel increase, 3 respondents believe that the measure would increase safety, whilst differing opinions are provided on the job creation and working conditions/ security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 30: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 10. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	Not applicable	Not applicable	No change	No change in working conditions/ security
National level public body	Don't know	No change in safety	Don't know	Increase in working conditions/ security
International level public body	0-1% fuel increase	No change in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	Increase in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	0-1% fuel decrease	Increase in safety	No change	Increase in working conditions/ security

Measure 11: Oblige Member States to share cross-border all necessary data that are required for traffic management and transport management

Table 28 presents the type of environmental and social impacts that may arise through the implementation of Measure 11. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Four respondents believe that Measure 11 would result in 0-3% fuel increase, 3 respondents believe that the measure would increase safety and working conditions/ security whilst differing opinions are provided on the job creation impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 31: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 11. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	No change in efficiency gains	Increase in safety	No change	Increase in working conditions/ security
National level public body	Not applicable	No change in safety	Don't know	Increase in working conditions/ security
International level public body	0-1% fuel increase	No change in safety	No change	No change in working conditions/ security
Other type of professional association	2-3% fuel decrease	Increase in safety	No change	No change in working conditions/ security
Private sector company	2-3% fuel decrease	Don't know	Don't know	Don't know
National level public body	0-1% fuel decrease	Increase in safety	No change	Increase in working conditions/ security

Measure 12: Involve CESNI in the development and adoption of technical specifications by revising the governance structure and adoption procedure for technical specifications of the RIS Directive

Table 29 presents the type of environmental and social impacts that may arise through the implementation of Measure 12. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. One respondent believes that Measure 12 would result in 4-5% fuel increase, 4 respondents believe that the measure would increase safety, whilst differing opinions are provided on the job creation and working conditions/security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 32: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 12. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	No change in efficiency gains	Not applicable	No change	No change in working conditions/ security
National level public body	Not applicable	Increase in safety	Don't know	Increase in working conditions/ security
International level public body	4-5% fuel decrease	Increase in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Increase in safety	No change	Increase in working conditions/ security

Measure 13: Introduce complaint mechanism (in Member States) to ensure a higher degree of harmonisation for RIS

Table 30 presents the type of environmental and social impacts that may arise through the implementation of Measure 13. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Two respondents believe that Measure 13 would result in 2-3% fuel increase, 3 respondents believe that the measure would increase safety, whilst differing opinions are provided on the job creation and working conditions/security impacts. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 33: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 13. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European professional association level	No change in efficiency gains	Increase in safety	No change	No change in working conditions/ security
National level public body	Not applicable	No change in safety	Don't know	Don't know
International level public body	2-3% fuel increase	No change in safety	No change	No change in working conditions/ security
Other type of professional association	2-3% fuel decrease	Increase in safety	No change	No change in working conditions/ security
Private company sector	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Not applicable	No change	Increase in working conditions/ security

Measure 14: Introduce a new Performance Measurement Framework

Table 31 presents the type of environmental and social impacts that may arise through the implementation of Measure 14. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Four respondents believe that Measure 14 would bring no change to efficiency gains, 3 respondents believe that the measure would not have any impact on working conditions/ security, whilst differing opinions are provided on safety and job creation. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 34: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 14. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European professional association level	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
National level public body	Not applicable	Don't know	Don't know	Don't know
International level public body	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private company sector	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Increase in safety	No change	Not applicable

Measure 15: Improve harmonisation between RIS and information services for other modes of transport (e.g. maritime)

Table 32 presents the type of environmental and social impacts that may arise through the implementation of Measure 15. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Four respondents believe that Measure 15 would bring no change to efficiency gains, 4 respondents believe that the measure would not have any impact on job creation, 3 respondents believe that the measure would not provide changes in working conditions/ security, whilst differing opinions are provided on safety. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 35: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 15. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
National level public body	Not applicable	Don't know	Don't know	Don't know
International level public body	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	Don't know	Don't know
National level public body	Not applicable	Increase in safety	No change	Not applicable

Measure 16: Specify more clearly the cases for the exchange of personal data

Table 33 presents the type of environmental and social impacts that may arise through the implementation of Measure 16. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Four respondents believe that Measure 16 would bring no change to efficiency gains, 3 respondents believe that the measure would not have any impact on safety, 3 respondents believe that the measure would not provide changes in working conditions/ security, whilst differing opinions are provided on job creation. It should be noted that 3 stakeholders answered that they did not know or that the question was not applicable.

Table 36: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 16. (n=9)

Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
European level professional association	No change in efficiency gains	No change in safety	Loss of jobs	No change in working conditions/ security
National level public body	Not applicable	Don't know	Don't know	Don't know
International level public body	No change in efficiency gains	No change in safety	Creation of jobs	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private sector company	No change in efficiency gains	Increase in safety	No change	Don't know
National level public body	Not applicable	Not applicable	No change	Not applicable

Measure 17: Develop templates and standards for the exchange of personal data

Table 34 presents the type of environmental and social impacts that may arise through the implementation of Measure 17. Out of 13 respondents, only 9 respondents filled in the table or were able to estimate the expected impacts. Three respondents believe that Measure 17 would bring no change to efficiency gains, 3 respondents believe that the measure would not have any impact on safety, 3 respondents believe that the measure would not provide changes in working conditions/ security, whilst differing opinions are provided on job creation.

Table 37: Please specify below any potential environmental (e.g. efficiency gains/savings) or social (e.g. safety, social protection, working conditions) impacts that may arise through implementation of Measure 17. (n=9)

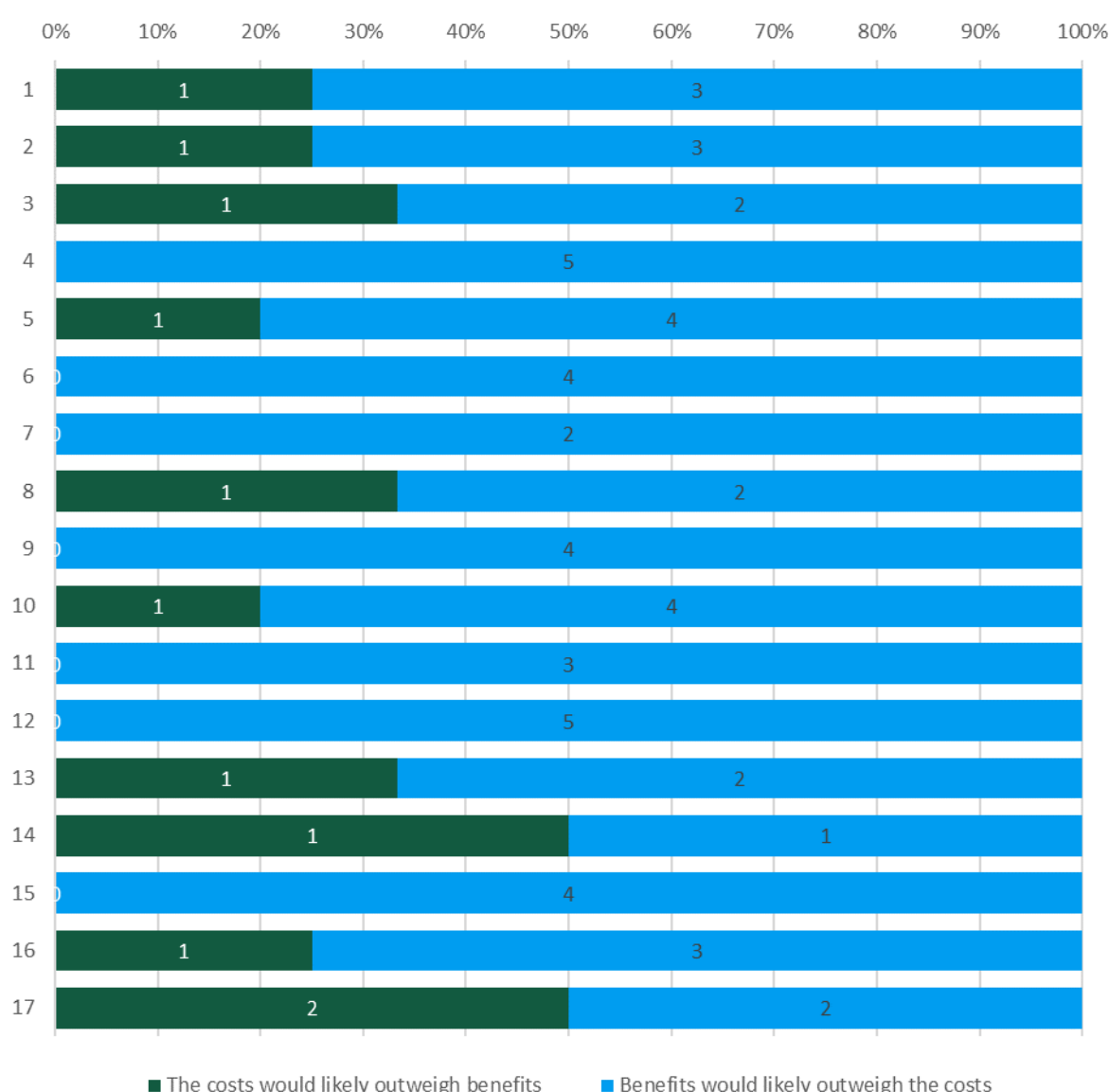
Stakeholder type	Potential efficiency impacts per year (in terms of fuel increase/decrease)	Potential impacts on safety	Potential impact on job creation	Potential impact on working conditions/ security
Inland Waterway Transport/ RIS user	Don't know	Don't know	Don't know	Don't know
European level professional association	No change in efficiency gains	No change in safety	Loss of jobs	No change in working conditions/ security
National level public body	Don't know	Don't know	Don't know	Don't know
Private sector company	Don't know	Don't know	Don't know	Don't know
National level public body	Not applicable	Don't know	Don't know	Don't know
International level public body	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Other type of professional association	No change in efficiency gains	No change in safety	No change	No change in working conditions/ security
Private sector company	Don't know	Don't know	No change	Don't know
National level public body	Not applicable	Not applicable	No change	Not applicable

Closing questions

This last section of the survey asked participants to describe the ratio of costs to benefits (economic, social and environmental combined) of these proposed policy measure.

Respondents reckoned that benefits would outweigh the costs for the majority of proposed policy measures. For Measure 14 (Introduce a new Performance Measurement Framework) and Measure 17 (Develop templates and standards for the exchange of personal data), an equal number of respondents deemed that benefits would outweigh the costs and vice versa.

Table 32: Considering the costs and benefits discussed in previous questions, how would you describe the potential ratio of costs to benefits (economic, social and environmental combined) of these measures? (n=9)



4. Analysis of the Public Consultation

Introduction

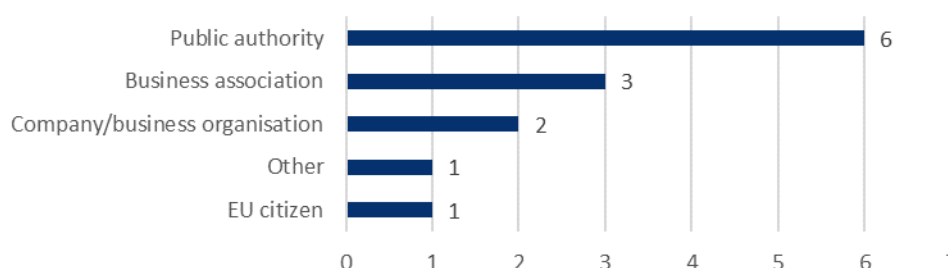
This appendix presents the analysis of the Public Consultation which was designed and implemented by the Commission over the period 16 August 2022 - 22 November 2022. To support the gathering of evidence for the Impact Assessment process on the revision of Directive 2005/44/EC, the Public Consultation aimed to gather public opinion on the shortcomings, challenges and possible perspectives of the RIS Directive and the possible ways in which the Directive could be revised.

In total, 13 responses were gathered, of which the results are presented in the following sections.

Profile questions

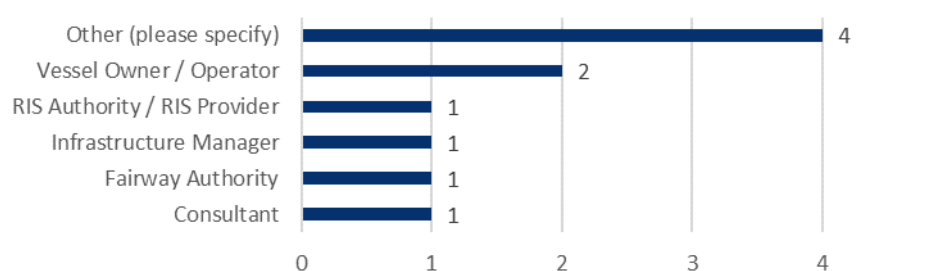
Out of the 13 responses gathered, seven responses were provided in English, three in Dutch, one in German, one in Portuguese and one in Romanian. The most represented stakeholder group comprised of public authorities (n=6), followed by business associations (n=3) and company/business organisations (n=2), as shown in the figure below.

Figure 33: I am giving my contribution as... (n=13)



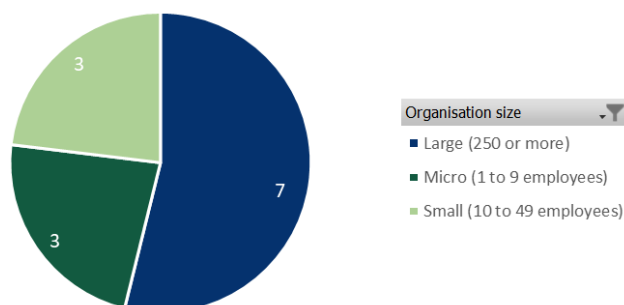
In terms of the scope of each stakeholder, only seven respondents provided an answer, with three answering as being international, three as being national and one as being regional in scope. Similarly, only two respondents answered as agencies and two answered as authorities. When asked to further specify their stakeholder category, the largest category was those that answered “other”, as shown in the figure below. These four respondents included one employee of a public administration, one port authority, one stakeholder working in inland navigation and one employee of a federal economic chamber.

Figure 34: In which capacity will you reply to this questionnaire? (optional) (n=10)



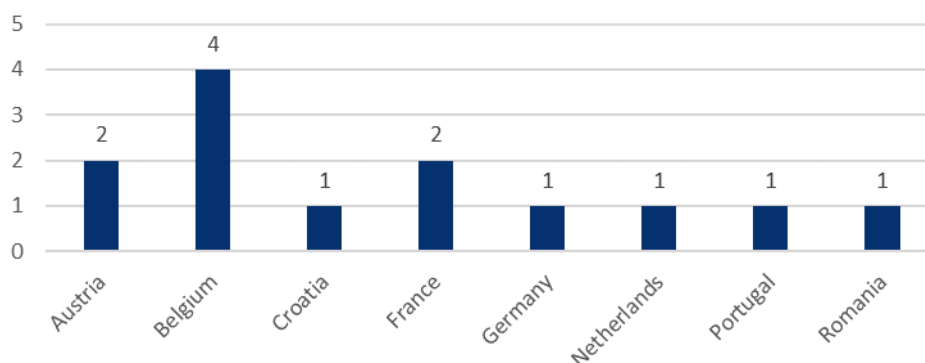
With regards to the organisation size related to the respondents, seven answered as being large (over 250 employees) while three answered as being small (1 to 9 employees) and small (10 to 49 employees) respectively, as shown in the table below.

Figure 35: Organisation size (n=13)



In terms of the geographical distribution of the respondents, the largest response was gathered from respondents in Belgium (n=3), followed by Austria and France (n=2 respectively).

Figure 36: Country of origin (n=13)



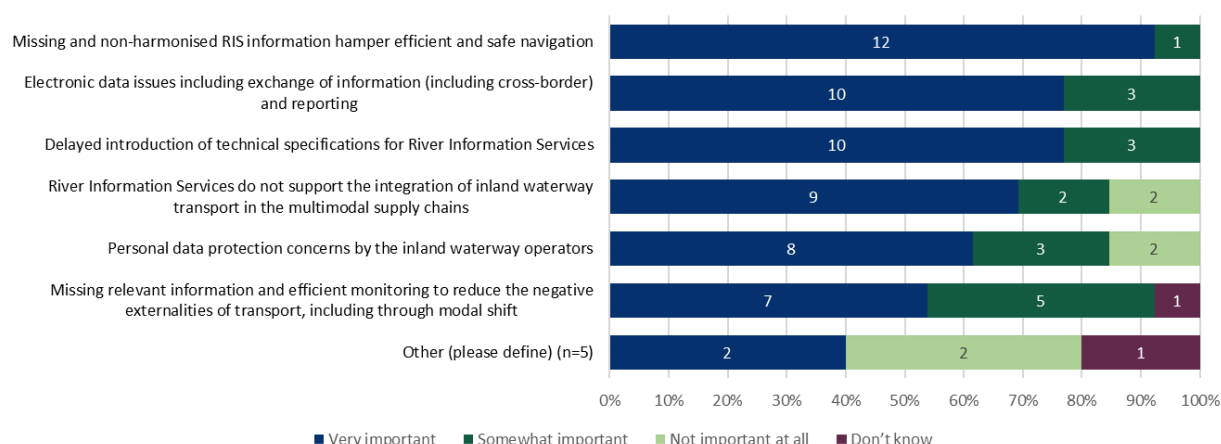
Section 1 - Problem drivers and baseline

The first set of questions pertained to the problem driver and baseline scenario as identified in the Impact Assessment. Firstly, regarding the importance of some of the challenges facing the implementation of RIS in Europe, the most important challenge was missing and non-harmonised RIS information hamper efficient and safe navigation (12 out of 13 respondents answering “very important”). For the option of the five stakeholder which answered “somewhat important” included one public authority, one federal authority, one company/business organisation, one business association and one EU citizen.

More generally, most of the identified challenges were perceived by all respondents to be very important, with the exception of two stakeholders⁵⁸ which provided answers under the “other” category. This included the same theme of minimum requirements on the data to be provided for navigation and voyage planning on inland waterways not being precise enough to fully describe the waterways network. The two additional answers provided under the “other” category included: [1] Data protection regarding movement of vessels (one Business association) and [2] the standardisation of information (one company/business organisation).

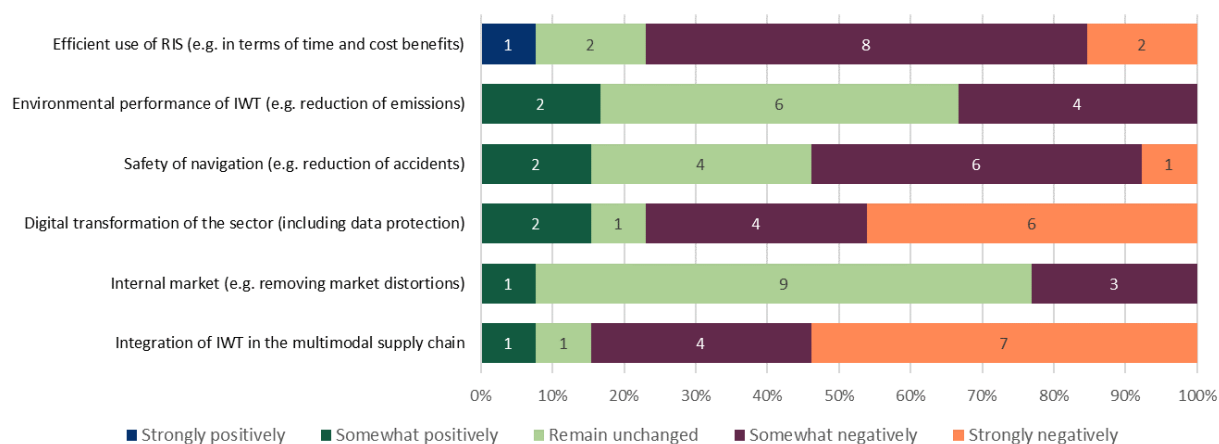
⁵⁸ One public authority and one business association.

Figure 37: Q1. In your view, how important are each of these challenges in the implementation of River Information Services (RIS) in Europe? (N=13)



The second question under this section pertained to the baseline scenario under the Impact Assessment. When asked if the legal framework of RIS remains unchanged, how they would expect the inland waterway sector to develop, most of the options were not perceived to develop in a positive manner (as shown in the figure below).

Figure 38: In your view, if the legal framework of RIS remains unchanged, how do you expect the inland waterway sector to develop in terms of... (N=13)



Indeed, the options of the internal market⁵⁹ and environmental performance⁶⁰ of the IWT were notably seen to remain unchanged if the Directive was not revised. By contrast, the options of the integration of IWT in the multimodal supply chain⁶¹, digital transformation of

⁵⁹ Answers for it remaining unchanged included four public authorities, three business associations, one company/business organisation and one federal authority.

⁶⁰ Answers for it remaining unchanged included four public authorities, and one company/business organisation

⁶¹ Answers for it being somewhat/ strongly impacted included five public authorities, three business associations, one company/business organisation, one EU citizen and one federal authority.

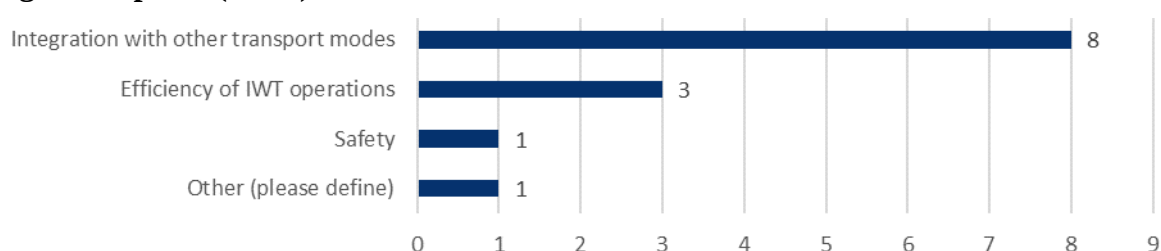
the sector⁶², safety of navigation⁶³, and the efficient use of RIS⁶⁴ was seen to be negatively affected if the RIS Directive was not revised.

In addition to the responses provided in the figure above, two stakeholders also provided further written answers. This included that if the RIS Directive was to remain unchanged, it may widen the gap between river transport and other modes (one public authority), while one business association noted that the RIS legal framework has limited influence on the integration of IWT with ports and the multimodal chain.

Section 2 - Areas of focus of a possible revision of the RIS Directive

Under this section, the questionnaire aimed to gather views pertaining to the difference approaches and measures that could be taken in the revision of the RIS Directive. When asked which area could have the highest impact, eight respondents answered that it would be through the integration with other transport modes. This is compared with only three answering for the efficiency of IWT operations⁶⁵ and safety⁶⁶. The respondent which answered “other” (one company/business organisation) answered that the standardisation of information would have the highest impact.

Figure 39: In your view, where should a possible revision of the RIS Directive have the highest impact? (N=13)



In a follow up question, respondents were invited to provide further explanation to their previous answer. Three answers were provided from three separate public authorities, including that:

- Efficiency of IWT operations is the primary objective of the RIS Directive, however the integration with other transport modes is as important, given the objectives of the Green Deal and the Sustainable & Smart Mobility Strategy.

⁶² Answers for it being somewhat/ strongly impacted included five public authorities, two business associations, one company/business organisation, one EU citizen and one federal authority.

⁶³ Answers for it being somewhat/ strongly impacted included four public authorities, two business association, and one EU citizen.

⁶⁴ Answers for it being somewhat/ strongly impacted included four public authorities, three business associations, one company/business organisation, one EU citizen and one federal authority.

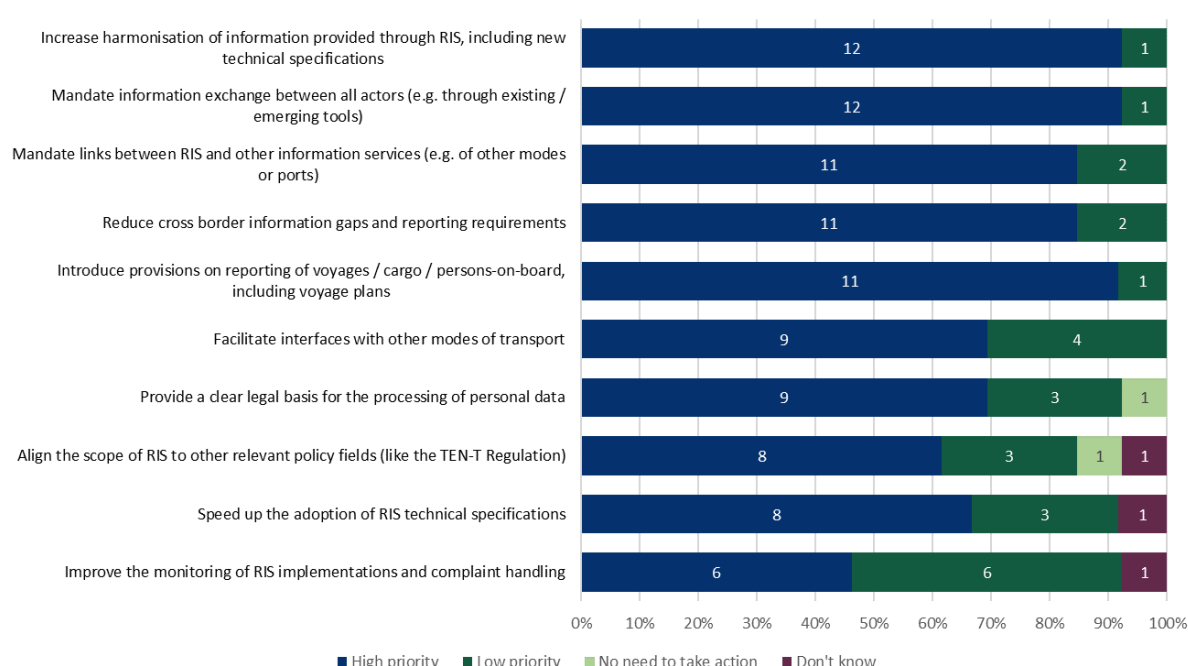
⁶⁵ This included two public authorities and one business association.

⁶⁶ This included one public authority

- The efficiency of inland navigation and of the handling of all shipping traffic in ports (berth management/guard quays; lock passages; shipping guidance) would be one of the most important areas of a revision of the RIS Directive.
- General digital transformation and navigation safety are almost as important as integration with other transport modes.

The following question went further in asking the respondents to answer which of the selected options provided should be a priority area under a revision of the RIS Directive. Overall, almost all of the options were seen to be high priority, with the exception of the improvement of monitoring of RIS implementation and complaint handling⁶⁷.

Figure 40: In your view, what should be the priority in each of these areas of a possible revision of the RIS Directive? (N=13)



When asked if any of the respondent would like to provide further information to their answer, one public authority and one business association both noted that there should be a clear legal basis for the processing of personal data.

Section 3 – Closing question

Under the last question of the Public Consultation, the respondents were asked to provide any additional comments on the revision of the RIS Directive, of which four answers were provided:

- *“Technical specifications for electronic ship reporting, following the ERI guidelines, are not sufficiently precise with regard to the ways and means of data exchange. The type of data exchange (attached file; email body text) and its structure (file*

⁶⁷ The six respondents which answered “high priority” included two public authorities, two business associations, and two company/business organisations. The six respondents which answered three public authorities, one business association, one EU citizen and one federal authority.

format) need to be further detailed. [...] technical specifications have to reflect the dynamism of waterways and their infrastructures, which are constantly changing. The level of granularity can be refined to account for, among others, movable bridges, details about ongoing lock operations and one-way traffic zone". [One public authority]

- "The highest priority for RIS at the moment is the exchange of travel data between different Member States" [One public authority]
- "To keep IWT relevant, economic operators should be able to opt for IWT as a logical and sustainable transport leg without any threshold. The directive should stimulate IWT to be in harmonization with other transport modes leading to integration or at least interoperability. Cargo-information shall be shared amongst the subsequent transport legs (independent of transport modes). Therefore, there is need for a multimodal data model (technical specifications). Data quality (timeliness, complete, relevant, accurate, trustworthy) must be ensured at all levels: cargo, voyage, vessel, network, infrastructure, etc. [...] A proper governance at a European level with the appropriate flexibility within all levels is needed to realize all these ambitions". [One public authority]
- "The full harmonisation of RIS is a "conditio sine qua non" for making optimal use of RisCOMEX. RisComex is the gateway to efficient and effective IWT and to the full integration in the total transport system/global supply chains. The necessary funding should be foreseen to make harmonisation/funding a fact". [One business association].

Section 4 – Position papers

As part of the Public Consultation, respondents were invited to submit an additional position paper along with their response to the survey questions. In total, three papers were provided and are their key points are summarised in the table below.

Stakeholder & Country	Key points
Public Authority, France	• With regard to linking the RIS Directive to new initiatives (Objective 1), RIS II could encourage inland waterway transport operators to make the ETA (Estimated Time of Arrival) of the vessel available to other transport modes. • With regard to clarifying the RIS Directive provisions on implementation of technical specifications and provision of RIS by Member States (Objective 2), the current technical specifications lack clarity and precision, leaving too much room for interpretation, and are not technologically adapted. This leads to heterogeneous implementation and interpretation between Member States, and sometimes even within some of them (such as in France). There should be a refinement in the Directive requirements (level of granularity; mandatory or nonmandatory data; single data repository with clear maintenance procedures) and set a clear timetable for implementation • With regard to clearer provisions on obligations of Member States to receive and forward information of ships in cross border operation (Objective 3), it is suggested that RIS II could encourage Member States to make online voyage reporting mandatory for security and statistical purposes • With regard to updating existing rules on privacy, security and re-use of information (Objective 4), it is important to reiterate the concerning re-use of information, various formats are being applied in the EU databases, e.g. through Eurostat or the TENtec Platform request data from public authorities while relying on a different data format than the one required by the RIS Directive.
Public Authority,	It is necessary for the following issues to be considered: • The objective of the current RIS-directive was to introduce the use of River

Belgium	Information Services with technical standards to develop these Services. With the RIS-COMEX project and the EuRIS platform big steps were taken towards harmonization. However, if we want to be able to get to a more safe, efficient and environmentally friendly Inland Waterway Transport with the possibility to interconnect with intelligent transport systems of other transport modes to guarantee maximum integration of IWT within the logistical supply chain, a more harmonized approach and finetuning between Member States is necessary. There is need for a more coordinated and supporting role of the EC. • Additionally, it is important to have technical standards for the development of RIS, but these standards should leave enough flexibility for further development and innovation in order to be able to adapt to fast changing needs and data systems. The current standards are very strict and encoded, which means that it is difficult to adapt to changing circumstances, needs and innovations. Possible approaches are to allow the results of EU-projects, under supervision of the EU, to act as de facto standards, to have a quicker process in acceptance of new standards by the EC. CESNI/TI and its ES RIS (European Standard for River Information Services) can play an important role if they are officially mandated not only to develop, but also to publish the standards officially. • Very important for the further development and adaption of the RIS directive is the relation with Traffic Management, with Smart Shipping (autonomous and automated navigation) and with Smart Logistics. A revision of the Directive is needed to incorporate these domains and look at the possibilities of Data Sharing (rather than only Data Exchange), to see what the influence will be on the Directive and how this can be adapted into the different standards.
Business Association, Belgium	• An emphasis should be placed on a coordinated approach in order to guarantee the continuous harmonised implementation of the various services and to develop an integral digitalization strategy for inland waterways that • monitors and where necessary enforces the full implementation of RIS • ensures and supports the continuity, reliable operation and interoperability of solutions and where necessary extension with due attention for 24/7 information system about status of waterway system • prepares smart shipping with ongoing activities including infrastructure (automated lock and bridge management) and shipping (automated and semi-automated navigation) • maps privacy and data protection requirements including access for authorised parties only, and • maps requirements for cyber resilience • Regarding River-Sea shipping examples of Scandinavian countries should be reviewed where no RIS services neither infrastructure exist but similar Vessel Traffic Services (VTS) systems, Automatic Ship Identification (AIS) and single window data sharing systems are in operation. These systems are used in marine traffic. In some BSR countries, such as the Nordics, inland waterways are connected to sea rather than other inland waterways. Seagoing vessels like river-sea ships are used in addition to inland barges. • Regarding multimodal integration where RIS in first instance provides information from authorities to the sector (A2B), in a next step it should contribute to a broader approach and support the industry at B2B level. • It is vital that the inland transport industry is interoperable to provide unrestrained access and competitive services. Therefore RIS, in line with its objectives, should contribute to better integrate inland waterway transport into the multimodal transport chain and to facilitate logistics processes. This should open the system for use at B2B level on a voluntary basis. • It is important to realise the full implementation of RIS, develop it to the next levels, ensure interoperability with other modes and solutions and develop an integral digitalization strategy for inland waterways.

5. NAIDADES and DINA Expert Group 1

Joint meeting

THE MEETING OF THE COMMISSION EXPERT GROUP ON INLAND WATERWAY TRANSPORT (NAIADES IMPLEMENTATION GROUP)

AND

THE MEETING OF THE EXPERT GROUP ON DIGITAL INLAND NAVIGATION (DINA EXPERT GROUP)

Thursday 7 July 2022, 09:30 – 17:00

Impact Assessment for the revision of the RIS Directive (14.30-16.00)

Introduction

DG MOVE recalled the recent history of the RIS Directive highlighting the Evaluation of the RIS Directive. The participants were directed to the DG MOVE website where they can find the Staff Working Document (SWD) and the supporting study carried out by Ramboll Management Consulting. It provides an overview of how the Directive has been received, its uses and its performance. The findings have shown that it has contributed to standardisation and harmonisation and that it was one of the main drivers of the digitalisation in IWT. However, some insufficiencies have also been identified (e.g. lack of harmonisation and slow adoption of standards, among others). A strong potential for improvement has been identified. Among the developments to be considered in the revision of the Directive is the use of digital solutions (e.g. initiatives such as eFTI, ESMW and RIS COMEX).

Following the introduction of DG MOVE, the contractor took the floor to introduce the aims of the session which would evolve around a discussion on the initial work done with respect to the draft problems, draft problem drivers and draft policy measures facilitated by voting using a Mentimeter poll. The contractor then presented the objectives of the revision of the RIS Directive, the goals of the Impact Assessment, the draft problem tree and the draft policy measures in more detail.

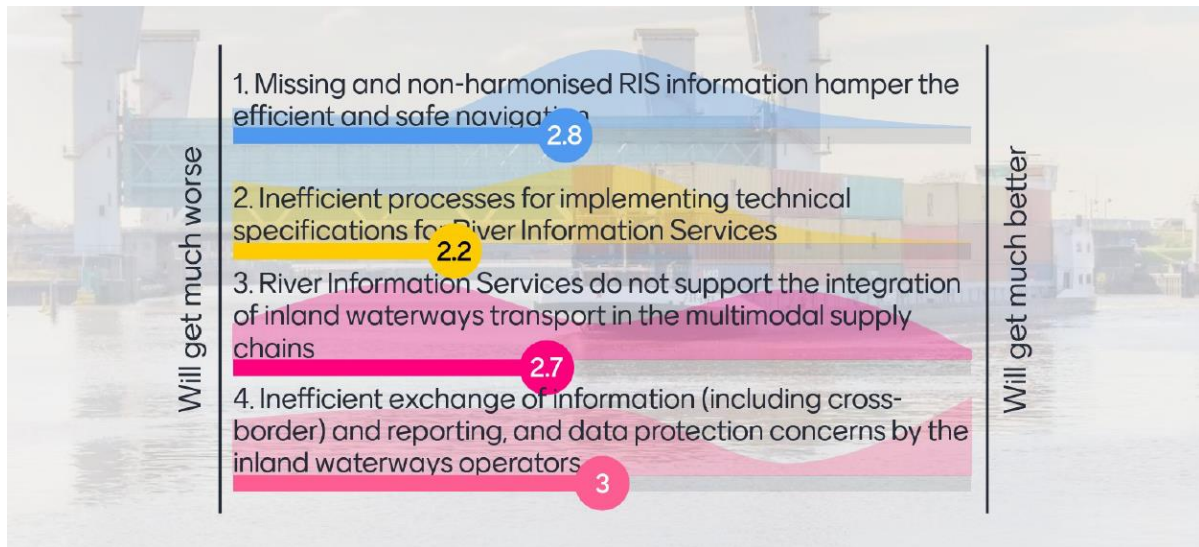
Discussion

Firstly, the draft problem tree was discussed followed by a discussion on the draft policy measures.

1. The draft problem tree

Mentimeter question: *If no revisions were made to the RIS Directive (i.e. the baseline scenario), how do you expect each of the identified problem drivers to develop?*

Figure 41: Mentimeter Q1 (n=26)



Most of the ratings were around 3 (will stay the same) indicating that the situation in relation to the problem drivers will stay relatively the same. In relation to the last problem driver (inefficient exchange of information, including cross-border, and reporting, and data protection concerns by the inland waterway operators, (which result into a limited amount of data being shared between competent authorities) some people voted 5 (will get much better). The contractor elaborated that this may suggest that there are other initiatives that could improve the situation by themselves without the contribution of the RIS revision and he encouraged the participants who voted to elaborate.

European IWT Platform explained his understanding that the RIS Directive is a piece of legislation which is in principle helpful, but that it should have been implemented better. To him, these problem drivers/problems relate to a process rather than to the Directive itself. What is lacking in his opinion are the root causes of the various problem drivers (underlying reasons why people might not be able or willing to take maximum advantage of the Directive).

- **The contractor** clarified that these are indeed process problems, but the Directive can play a role in solving them. This is an impact assessment which has a set process that needs to be followed: the identification of problems and problem drivers, followed by measures that can address these which will then be packed in comprehensive policy options. The measures presented later may clarify the detailed thinking further.
- **DG MOVE** acknowledges that this concept is hard to understand and that the Better Regulation Guidelines make it very scientific.

Ministry of Transport, Public Works and Water Management, NL said that he scored the development of all the draft problem drivers with a 3 (will stay the same). Many draft problem drivers have already developed in recent years and there may be some shifts in the future. Last week, the EURIS portal has been launched where all services are implemented in one portal. As for the first draft problem driver (missing and non-harmonised RIS information hamper the efficient and safe navigation), the non-harmonisation aspect may be missing within the EURIS portal but that is up to the Member States. The second draft problem driver (inefficient processes for implementing technical specifications for River Information Services) is also addressed in EURIS. The third one (River Information Services

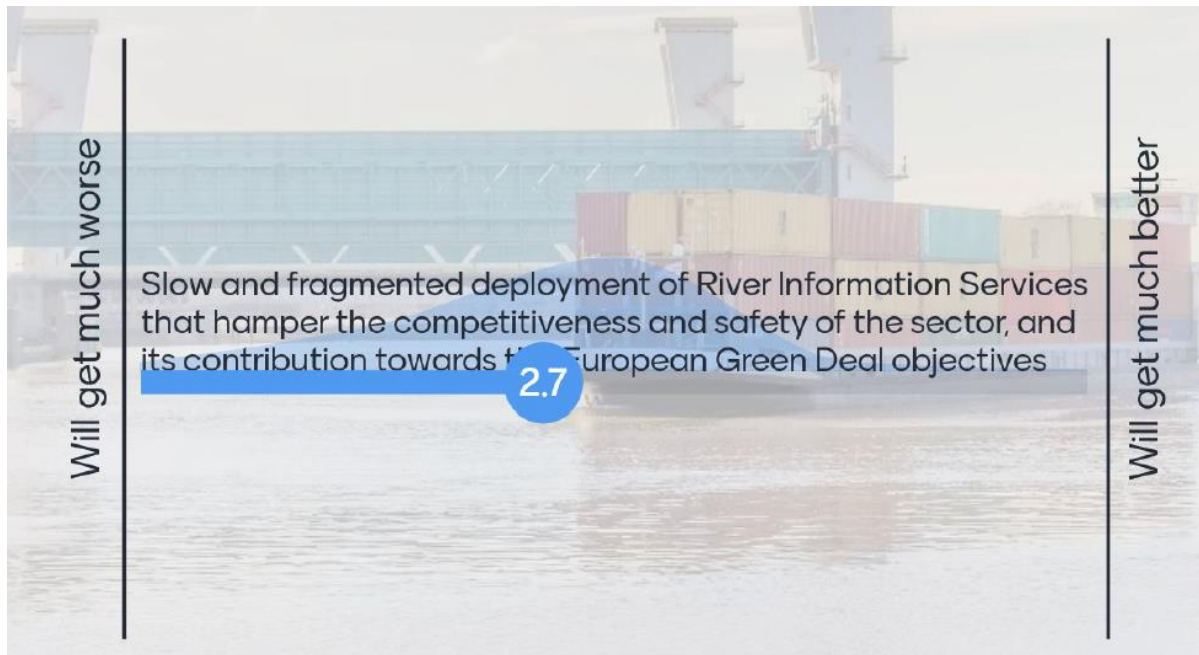
do not support the integration of inland waterways transport in the multimodal supply chains) is difficult, as the RIS Directive addresses itself directly to the authorities with no specifics on the integration in multimodal supply chains. Therefore, if the RIS does not oblige anything, then nothing changes. However, EURIS includes an obligation to share information with other logistic partners in order to become more active in intermodal supply chains. In the last draft problem driver (inefficient exchange of information, including cross-border, and reporting, and data protection concerns by the inland waterways operators) it is important to ask what we are trying to organise. If the priority is just safety, then the solution is more straight-forward. This would mean a free-market economy where operators do not have the incentive to share information as it would make them less competitive. Decision on having an efficient market or a free market needs to be made. Consequently, the RIS Directive can decide on how to address this. To sum up, the first three draft problem drivers might not be problem drivers anymore as the EURIS portal addresses these. A final point on harmonisation was stressed. Not all Member States have implemented RIS correctly, therefore if the revision of the Directive does not enforce it correct use, then substantial positive developments are not likely.

- **DG MOVE** appreciated the understanding of the baseline and, especially, on how the use of RIS COMEX and EURIS will affect the draft problem drivers. There has been a lot of joint development between various stakeholders across Europe. RIS COMEX has now shaped the way how RIS legislation will develop in the future. As for the second draft problem driver (inefficient processes for implementing technical specifications for River Information Services), it could be misunderstood. It concerns the whole process, from the development to adoption. The process is very inefficient and needs to be addressed by RIS. The involvement of CESNI in this process should be reflected.

Supreme Navigation Authority fully agreed with **Ministry of Transport, Public Works and Water Management, NL** that if there is no revision to the Directive then nothing will get much worse or much better. However, he does not agree that harmonisation of information will be solved with EURIS. In some countries, it takes a long time for the information to be updated (weeks or months). That poses a big problem. The portal provides a way to distribute and collect information, but the problem is not solved. Additionally, EURIS is based on the current standards, but new standards (like automation) need to be considered and, currently, the time needed to implement new technical standards takes too long. An example was given of a proposal that at the current rate would get implemented in 2029.

Mentimeter question: *If no revisions were made to the RIS Directive (i.e. the baseline scenario), how do you expect the identified problem to develop?*

Figure 42: Mentimeter Q2 (n=23)



The findings on the expected development of the draft problem showed a similar pattern to the draft problem drivers with majority votes around 3 (will stay the same).

European IWT Platform mentioned that as a starting point, implementation needs to be addressed. If you launch something like EURIS you need to increase awareness, in order for it to be used. Understanding its use, whether it can be improved and where it should be made mandatory is the next step.

- **The contractor** stated that some of the draft measures could also address part of this issue as one of the decisions relates to making guidelines, encouraging or making mandatory the various aspects of RIS.

The Central Commission for the Navigation of the Rhine (CCNR) highlighted the issue of the adoption of technical specifications. The future holds new challenges like automation and alternative fuels which will require the adoption of new technological specifications. CESNI could speed up the adoption, but there is also an implementation issue which should be distinguished.

II. Policy measures

The contractor introduced the process of the development of the draft policy measures.

Mentimeter question: *Please rank the policy measures according to their relevance/importance in addressing a given problem driver.*

Figure 43: Mentimeter Q3 – Measures to tackle missing and non-harmonised RIS information that hamper efficient and safe navigation (n=23)

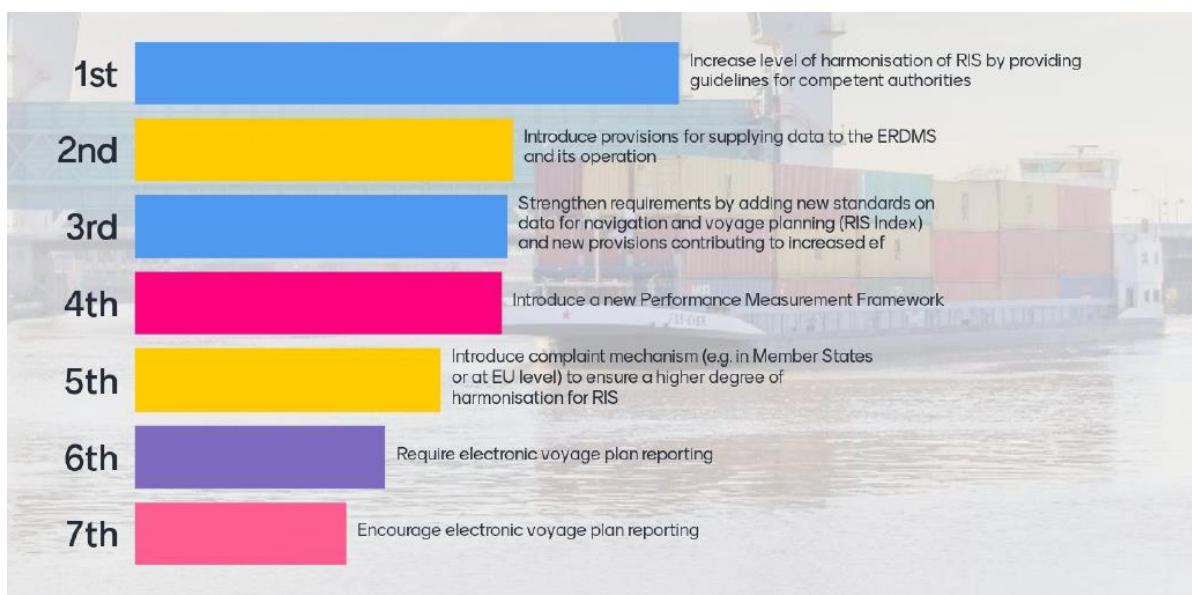


Figure 44: Mentimeter Q4 – Measures to tackle PD2 on the inefficient processes for implementing technical specifications for RIS (n=21)

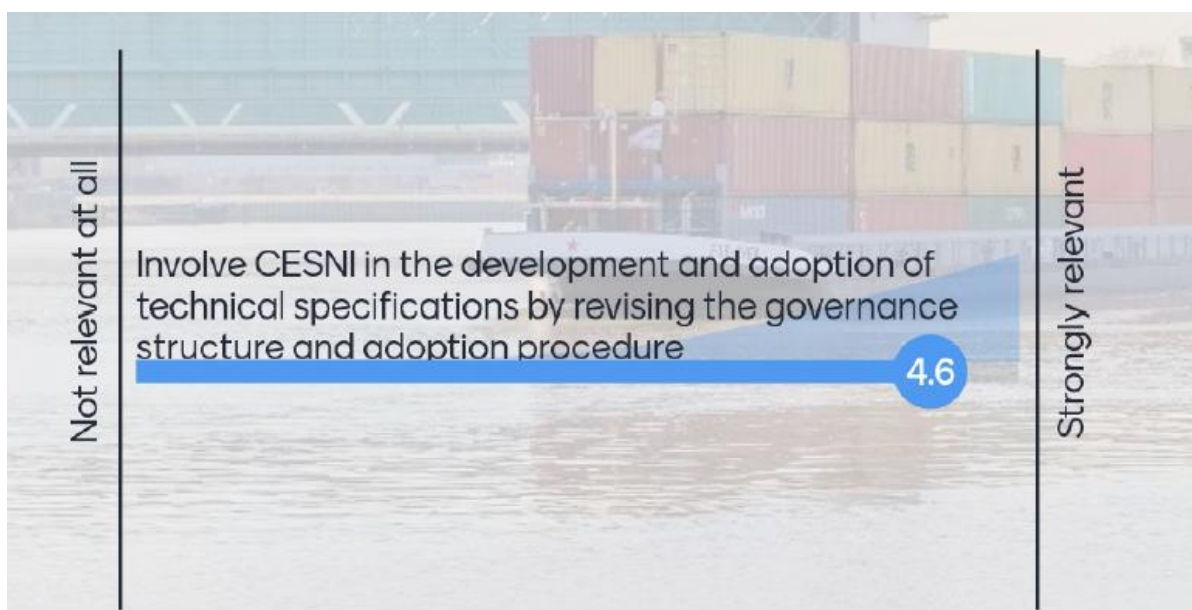


Figure 45: Mentimeter Q5 – Measures to tackle PD3 on RIS not supporting the integration of IWT in the multimodal supply chains (n=24)

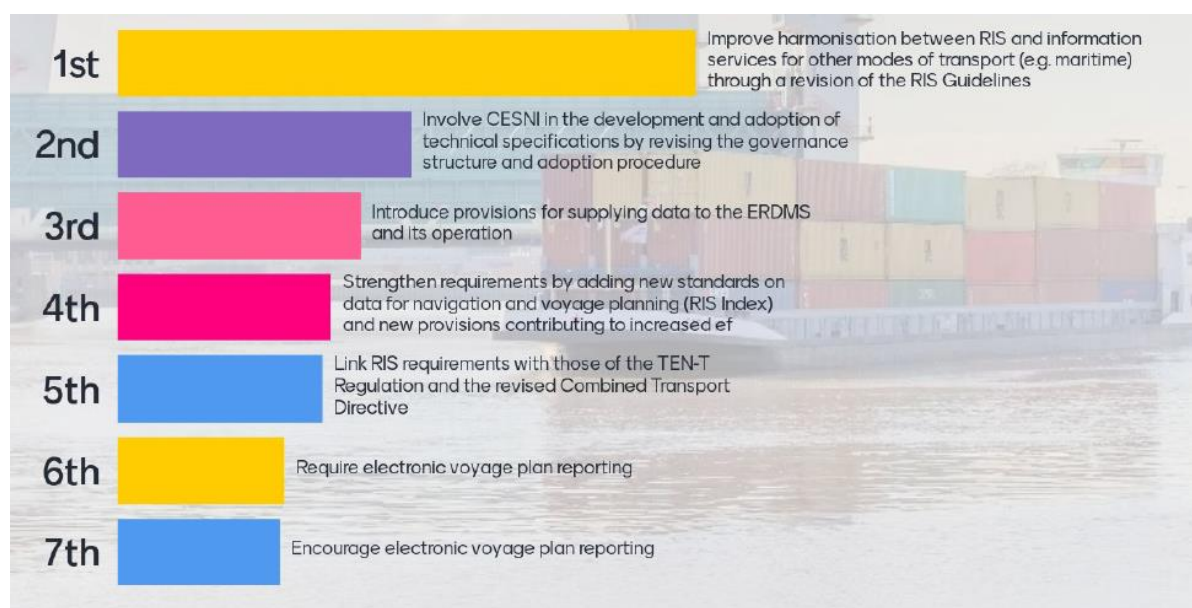
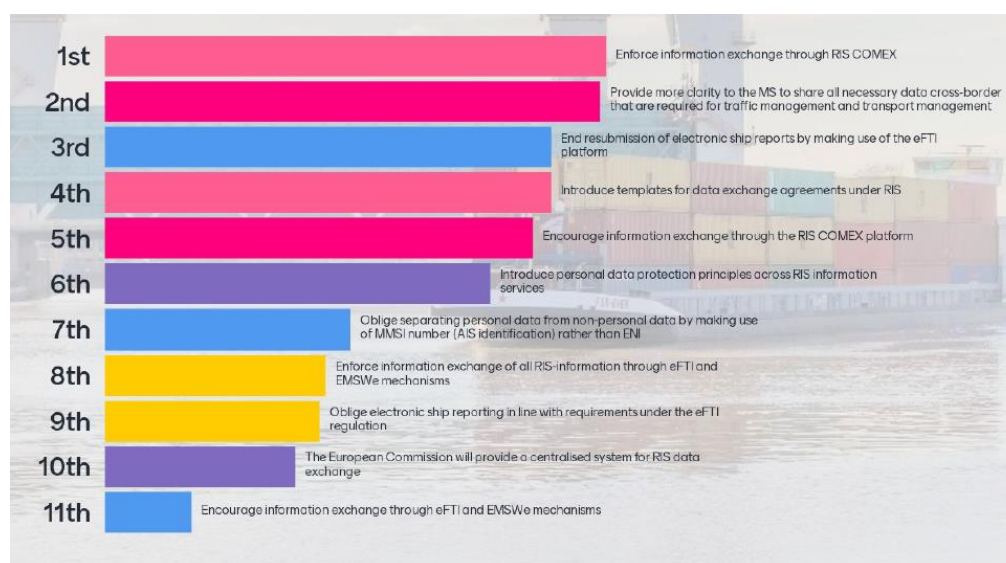


Figure 46: Mentimeter Q6 – Measures to tackle PD4 on inefficient exchange of information and reporting and data protection by inland waterway operators (n=22)



A round of plenary discussion followed once the voting on the ranking of the draft policy measures for all the draft problem drivers was completed.

INE pointed out the importance of understanding the scope of the various measures. For example, when comparing eFTI and RIS, the latter is about the movement of the vessels and the former is about the movement of the goods.

Ministry of Transport, Public Works and Water Management, NL agreed on Mr Hemeleers' point. There is a big difference in what the eFTI and RIS include. He also expressed his surprise on the voyage reporting not being seen as important as he deems it very significant.

Bureau Telematica Binnenvaart found it interesting to see that providing guidelines for competent authorities was seen as very important. This brings us back to the point that there are not many issues related to the RIS Directive itself but mainly in the implementation in different Member States. Therefore, guidelines would be a big step towards harmonisation.

Ministère de la Transition Écologique, FR showed his support for the involvement of CESNI. Furthermore, he expressed his concern on two draft measures that he believed to go beyond the scope of RIS, namely the requirement of electronic reporting which falls into the competence of the Member States and relevant authorities and the requirement of information exchange between eFTI and EMSWE. For example, eFTI only deals with goods and RIS also with the number of persons which is not covered by either of the two initiatives.

European IWT Platform brought back the discussion on the root causes. Explaining that when these would be understood, prioritisation make take place and some measures may no longer be needed. Additionally, he believes the discussion should concentrate more on the future developments than the past.

- **Bureau Telematica Binnenvaart** reacted by pointing out that for him the root cause is RIS not being enforced and the authorities' insufficient effort in implementing it well.
- **European IWT Platform** agreed that it could be one of the causes, but insufficient technical capabilities could also play a role.

Finally, **DG MOVE** took the floor to reflect on the discussion. DG MOVE clarified that RIS deals with both transport and traffic management. A crucial component of RIS is the electronic ship reporting relating to voyage, cargo and persons on board. We can observe synergies between the cargo part and eFTI. There is a need to understand whether and how we can converge the two or come up with a new option. The next steps of the study include the specification of the baseline and estimation of the impacts. As for the enforcement issue, it was highlighted as a significant problem and it is important to point out that there are draft policy measures already considered to address this aspect (e.g. require electronic voyage plan reporting, enforce information exchange of all RIS-information through eFTI and EMSWe mechanisms, enforce information exchange through RIS COMEX, oblige electronic ship reporting in line with requirements under the eFTI regulation).

- **Ministry of Transport, Public Works and Water Management, NL** reacted to DG MOVE highlighting that eFTI information on cargo is more related to calamity management rather than transport management.
- **De Vlaamse Waterweg** commented on the cargo information that is available through eFTI saying that waterway authorities should be able to get the information for all purposes that they require and not only for calamity abatement.
- **Bureau Telematica Binnenvaart** stressed the importance of good mobile connections for sending electronic reports.
- **DG MOVE** clarified that this is an important topic but not within the scope of RIS and there are other relevant pieces of legislation for this purpose.

DG MOVE and **the contractor** encouraged the participants to share their comments on the draft policy measures in writing. In terms of the next steps of the project, data collection using surveys will start during the summer and will be complemented by around 40 interviews. The participants were encouraged to participate, help disseminate the surveys,

take part in interviews, and help the contactor reach, in particular, the end-users and SMEs. Lastly, the participants were thanked for their input and interaction during the meeting.

6. NAIDADES and DINA Expert Group 2

Joint meeting

THE MEETING OF THE COMMISSION EXPERT GROUP ON INLAND WATERWAY TRANSPORT (NAIADES IMPLEMENTATION GROUP)

AND

THE MEETING OF THE EXPERT GROUP ON DIGITAL INLAND NAVIGATION (DINA EXPERT GROUP)

Monday 12 December 2022, 09:30 – 17:00

Hybrid meeting (WebEx/Physical)

Impact Assessment for the revision of the RIS Directive (14.30-16.00)

Introduction

The meeting was chaired by Commission Unit MOVE D3 "Ports and Inland Navigation". DG MOVE welcomed the members of the **joint meeting of the DINA and NAIADES Commission Expert Groups**. The participants of the Workshop consisted of members of the NAIADES Expert Group, members of the DINA Expert Group, representatives of the European Commission (DG MOVE) and five members of the Consortium performing the evaluation support study from Ramboll Management Consulting and Panteia, including the Project Manager of the study. As the experts' active participation was essential to achieving the purpose of the workshop, the study team circulated a brief introductory document before the meeting, in which the objectives and format of the workshop were presented. In this document, participants were asked to consider several aspects related to the proposed policy measures to facilitate the verification of some of the key outcomes of the project at its current stage of progress.

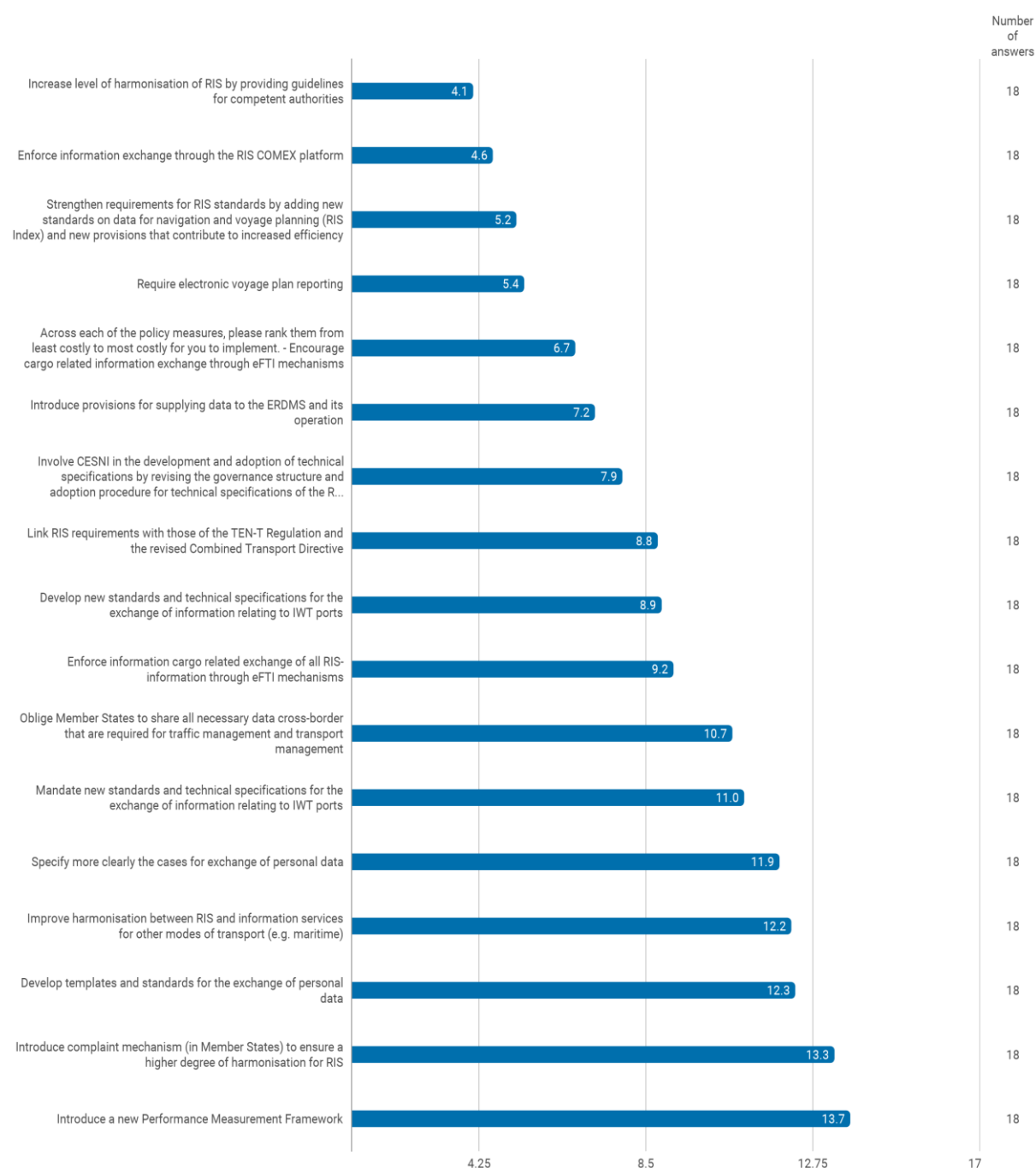
Discussion

As a warm-up exercise for the discussion with the experts, two exercises were organised via SurveyXact which asked participants to rank the 17 measures from the least costly to the costliest to implement, while the second exercise asked them to rank these from the least beneficial for RIS users to the most beneficial.⁶⁸

The following graphs present the results from the two polls. The graphs present the average ranking for each of the measures. For the first question, the graph presents the measures ranked from least costly (ranking 1) to most costly (ranking 17) to implement.

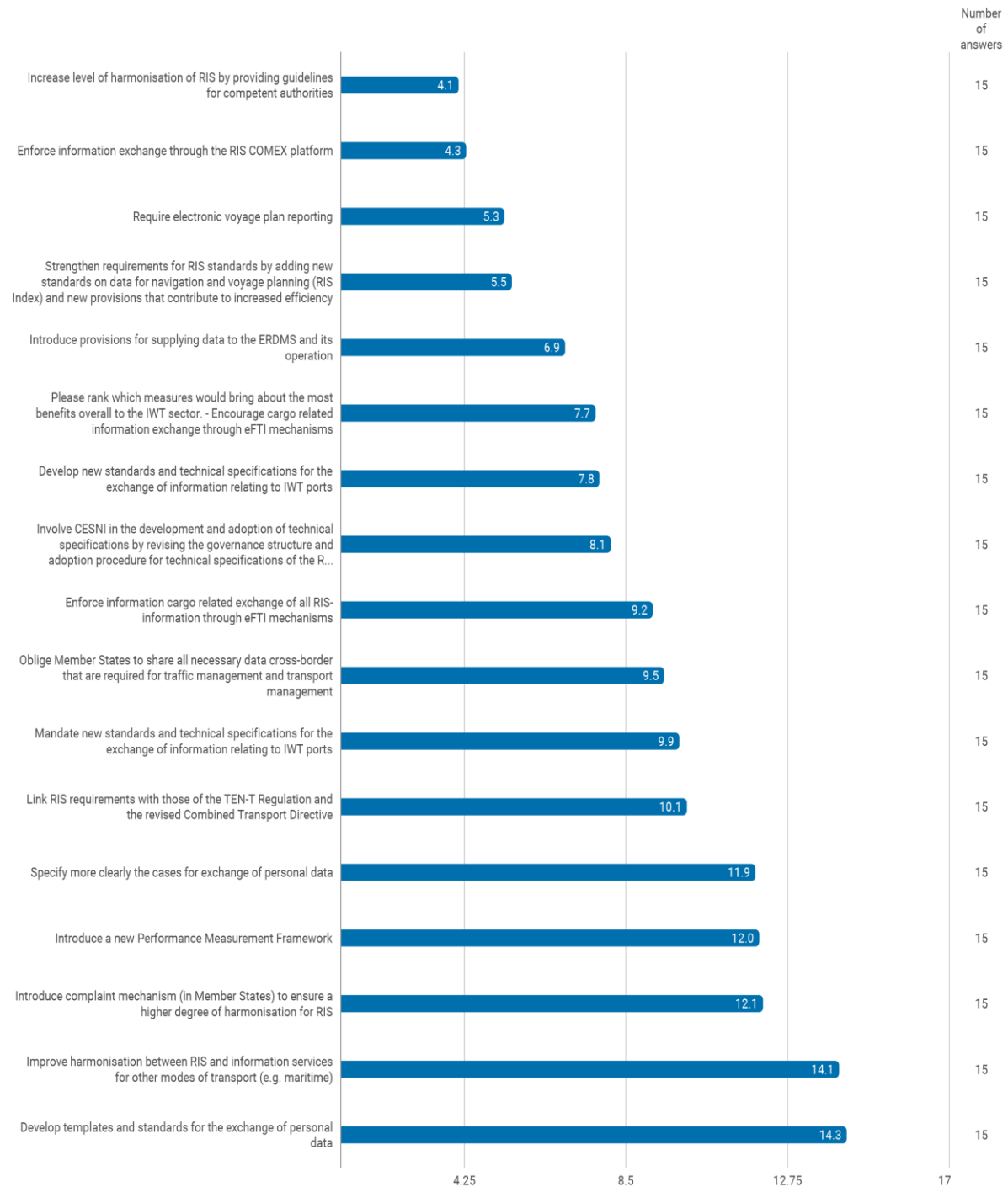
⁶⁸ A general comment from the participants to the meeting related to the difficulty of ranking with precision all of the policy measures. In addition, several experts stressed that implementation costs greatly varied depending on the types of costs that were intended by the question and the actors the costs applied to. Since the question was related to costs for each participant's organisation, the experts were invited to respond to the best of their abilities where they deemed that the question was relevant for them. Furthermore, it was agreed not to use the outcomes of the polling as formal evidence in the study. Finally, a limitation of the data provided by the graphs revolves around the limited number of responses that were received.

Figure 47: Across each of the policy measures, please rank them from least costly to most costly for you to implement (n=18)



Similarly, the second question pertained to measures which could bring, overall, the most benefits to the IWT sector. For this question, the measures are ranked on the average from the most benefits (ranking 1) to the least benefits (ranking 17).

Figure 48: Please rank which measures would bring about the most benefits overall to the IWT sector (n=15)



Following this, a plenary discussion was held regarding key topics of the study.

Firstly, integrating the use of eFTI and RIS COMEX to increase and harmonise the exchange of RIS-related information generated mixed opinions. Some participants remarked that the purposes of eFTI and RIS COMEX are inherently different since eFTI is used for logistical purposes and cargo-related type of information, whereas RIS COMEX gathers safety-related type of information. A few experts stated that since eFTI concerns business-to-government communication, there is an overlap between the information it provides and the information relevant for RIS COMEX and, as a consequence, eFTI may not be entirely incompatible for calamity abatement purposes. Nonetheless, the general conclusion was that eFTI has a different legal basis and a different objective than RIS COMEX in terms of track-and-trace information, and although one of the accompanying effects of eFTI has been to harmonize RIS by requiring Member States to excerpt cargo-related information on a digital format, a combination of the two instruments would not be fruitful for harmonising RIS-related information. Another important point emerging from the discussion is the need to strengthen RIS by making eFTI mandatory for all boat masters. Currently, whilst Member States are bound to accept eFTI, it is not mandatory for boat masters to send it. Since eFTI is designed as an optional tool, ship owners can choose whether to send the data electronically, greatly impairing the efficiency gains of eFTI. As a consequence, experts reported that while an obligation for all boat masters to file eFTI might increase administrative costs, it would also allow Member States to gather more information on cargo, (other than data on dangerous goods).

Another remark concerned the fact that only CEERIS, (one of the two systems created by RIS COMEX), should undergo further harmonisation. As a matter of fact, the RIS COMEX project has evolved into EURIS and CEERIS, two platforms for the exchange of information used by different countries. EURIS is mainly used by upper-Danube, Rhine and Mosel countries, CEERIS is used by lower-Danube and Sava countries. Whilst electronic reporting has become mandatory for some of the countries using EURIS, it is not yet mandatory for countries using CEERIS due to different reporting requirements imposed by the local administrations that are not standardized with the RIS Directive Annexes.

As a general comment on the assumptions for the parameters substantiating the policy measures, experts stressed that the types of assumptions greatly depended on the actors that provided them. In particular, the fourth and fifth parameters, (respectively on the complaint mechanism and on the performance measurement framework), were considered unrealistic. On the complaint mechanism, experts stressed that complaints and the costs thereof are not linked to objects (ISRS) but rather to RIS-related problems. A few experts also reckoned that the assumptions for the costs and impacts of the complaint mechanism were too dispersive as they included a wide scope of information linked to very different parameters. It was also suggested that a complaint mechanism should not be operated at the Member State-level, but rather at the corridor-level. For what concerns the performance measurement framework, it was stressed by the experts that its costs would greatly change depending on what the key indicators chosen for framework are and on whether the framework is based on a Member State- or corridor-level, suggesting a strong preference for the latter.

In light of the complexity in gathering data on RIS, one of the participants also recommended to categorise vessels into fleet families, contact representatives for each group of fleet families and, finally, address data gaps by deriving information that would be applicable to the entire category using logistical assumptions.

A few more takeaways from the discussion related to:

- The assumption for the modal shift for inland navigation in Europe was questioned by the experts, although they did not agree on whether the consultant's estimate was too low or too high. So, the assumption (as all other assumptions) will have to be clearly justified
- The involvement of CESNI in adopting RIS standards, which was welcomed by the experts as it is expected to increase swiftness for the adoption of technical standards on the RIS Directive
- The desirability that PIANC guidelines are considered as much as possible by the work of CESNI should the latter be entrusted with the adoption of RIS standards
- The support for a need to clarify the management of data, possibly allowing barge owners to autonomously decide who they share their data with
- The protection of company data and the need of RIS-users for Member States to ensure that the illegal use of AIS data is fought against, as this data may disclose contractual relationships and sensitive commercial information

7. Stakeholder Workshop 1

Minutes

Online workshop with RIS users and representatives of the IWT sector

Thursday 26 January 2023, 9 – 11

Online meeting (Microsoft Teams)

Introduction

The first stakeholder workshop was organised to collect the feedback of RIS users, in particular skippers, on the contractor's estimates on potential costs or expected benefits stemming from the proposed policy measures to update the RIS Directive. The workshop gathered six participants, drawing from the staff of enterprises providing inland navigation and logistics ICT, representatives of networks of private businesses and members of the shipping sector associations and non-profit organisations for innovation in the inland navigation industry. The workshop was also joined by one representative by DG MOVE, and it was moderated by three participants from the contractor's side.

Agenda

The agenda included an introduction of all participants, an overview of the measures proposed with a particular focus on electronic cargo reporting, voyage plan reporting, and information required for voyage planning and, finally, a discussion on measures relating to the uptake of Smart Shipping concepts.

Discussion

The first topic for discussion related to an overview of the impacts of proposed policy measures on operations in the wheelhouse. An initial point raised by participants revolved around whether there was an actual need to involve ports as part of the addressees for the estimates on incurred costs or saved benefits. The contractor explained that since a large part of inland navigation traffic takes place within the context of ports, and in view of the limited data-exchange procedures that seems to take place between ports and skippers, it was important to include ports as subjects of estimates. One of the stakeholders appreciated the contractor's accuracy in drawing a difference between inland ports and deep seaports, since there seems to be a disparity between the way the authorities have developed RIS and the level of connection of deep seaports to RIS. As explained, deep seaports usually act separately from the rest of the RIS community, even if there is a large potential for them to better connect to the RIS environment.

Concerning policy measures relating to electronic voyage reporting, it was further noted that at present, the RIS Directive provides an obligation for fairway authorities to provide electronic voyage reporting for Class V vessels only, which is not uniformly enforced by authorities. One of the participants also remarked that any proposed policy measure on Estimated Times of Arrival, ("ETAs"), should be thoroughly thought through, since ETAs may have an exponential impact for skippers depending on whether they are calculated on shore or onboard, and on whether there are journey interruptions.

Concerning the RIS COMEX project and the two derivative platforms of EuRIS and CEERIS, participants highlighted that their uptakes are slow both on the authorities' side and on the RIS users' side. On one hand, it was highlighted that individual Member States are not always keen on taking the responsibility for ensuring the smooth running of the digital environment relating to RIS reporting; on the other hand, it was also held that failure to support business stakeholders in using said platforms results in the industry perceiving no benefit stemming from the RIS Directive. To provide a concrete example, one of the participants noted that, despite the existence of EuRIS and CEERIS, in one region in Europe skippers still need to log into 10 to 15 online portals to provide their vessels' positions. To solve this issue, participants held that tangible actions need to be made available for RIS users, otherwise businesses will seemingly not be interested in any discussion on a possible update of the RIS Directive. Furthermore, it was noted that policy measures that have an immediate and daily effect for skippers should be properly communicated to them, in order to ensure skippers' cooperation in following the rules.

For policy measures that aim to realise the benefits of the digital waterway network, it was held that the network infrastructure firstly needs to be completed. To this end, participants suggested that one crucial step should be taken vis-à-vis the RIS Index which is not always available in a proper format. One of the stakeholders also suggested that it could be beneficial to mandate the development of a digital waterway network for all of the European inland waterway infrastructure.

On calculations of the benefits of electronic reporting in terms of the administrative burden decrease for skippers, it was agreed that filing a first electronic report should not take any longer than twenty minutes. Importantly, one of the participants remarked that filing an electronic report should allow skippers to avoid further reporting obligations, which is currently not the case. A general question posed by one participant was whether it is the crew onboard or on shore that submits reports, and respondents held that although reporting from shore is allowed in all regions, it mostly happens on the Danube river due to its special business structure for inland waterways commercial transport. In addition, it was suggested that calculations on the reduction of the administrative burden should factor in costs and benefits for the receiving end of electronic reports, most notably the side of the authorities. The contractor informed stakeholders that these estimates had also been explored through other discussions with fairway authorities. Finally, it was argued that in some regions electronic reporting is allowed by only few countries, whilst others still require Very High Frequency ("VHF") reporting, impairing the core purpose of the RIS Directive of harmonising requirements in the IWT sector.

The contractor then asked participants to rank proposed policy measures on the basis of their magnitude ranging from low, medium and high. One of the respondents held that the policy measure that foresees an obligation for Member States to share all data required for traffic management and transport management in a cross-border way has the highest magnitude. He added that at this stage of implementation of RIS, it is crucial that the available services are made mandatory not only for users but also for all authorities. Another respondent held that authorities should not only be able to share the necessary traffic management and transport management data in a cross-border way, but also to receive them, as not all Member States allow the filing of electronic reporting. Concerning the magnitude of mandating new standards and technical specifications for the exchange of information relating to IWT ports, respondents had mixed opinions. Some participants argued that RIS users see eFTI as unrelated to RIS, others held that if users were allowed to use eFTI across all transport modes, a beneficial one-stop shop could be created. It was also highlighted that despite the general opinion of skippers, eFTI may still very well be an important factor for RIS, especially in view of its interconnections with the digital environment for inland shipping, however respondents reminded that until eFTI is properly

used and implemented, it is hard to predict its impacts on RIS. One of the participants noted that under the current eFTI Regulation, no enforcement measure is foreseen, making the uptake of eFTI entirely dependent on the willingness of Member States to use it. Since skippers may only be encouraged to use eFTI, a participant suggested that all policy measures aimed to encourage exchange of information through eFTI should be given priority.

A few stakeholders suggested that rather than focusing on standards for the exchange of information relating to IWT ports, it should firstly be ascertained whether the systems used by IWT can have interconnections with the RIS environment. For instance, it was argued that it is sufficient to mandate ports to meet the same RIS technology standards in delivering information, rather than requiring ports to develop entirely new standards. Furthermore, it was recalled that the European Commission already intends to make RIS the eFTI platform, in order to organize information flows so that RIS users will have to submit data only once. One participant reminded that making electronic reports available for inland ports does not revolve around technical specifications, but rather it concerns the special type of privacy accorded to ERI reports.

For what concerns the effects of obliging voyage plan reporting for the authorities, one of the participants noted that adding ETAs to voyage plans will be challenging in view of ETAs' accuracy and adequacy, (for instance in situations where a voyage is interrupted). In addition, the uncertainty of ETAs could also make skippers liable of providing false information, should ETAs become part of the data required by the authorities. As a result, a general comment from all participants was to thoroughly explore the consequences for RIS users of mandating the provision of ETAs data. Another respondent remarked that ensuring interactive voyage planning onboard is already problematic, questioning which actors will be participating in the interactive voyage planning mechanism. However, it was also held that if the benefits of this mechanism are clearly demonstrated to skippers, there will not be a need to impose obligations on RIS users to participate in it. One of the respondents added that while there are clear benefits linked to providing reliable estimates for locks and infrastructure capacity, the effort required of barge owners to take part into this system needs to be ascertained.

Lastly, the contractor asked participants to validate assumptions on estimates for costs and benefits related to an obligation for voyage planning. It was held by two stakeholders that preparing a voyage plan report with details on ETAs at locks, movable bridges and berths does not take a boat master 34 minutes. Moreover, one respondent argued that voyage plan updates for inland skippers should not occur daily, since some voyages last less than one day. In relation to the energy consumption benefits stemming from the capacity of authorities to provide more reliable estimates on waiting times at locks, one participant noted that there are many differences between free-flowing sections and non-free-flowing sections of inland navigation channels, warranting a more thorough analysis of cost assumptions connected with mandating ETAs-information.

The remaining items on the agenda were discussed as part of the second workshop with skippers.

8. Stakeholder Workshop 2

Minutes

Online workshop with RIS users and representatives of the IWT sector

Thursday 27 January 2023, 9 – 11

Online meeting (Microsoft Teams)

Introduction

The second stakeholder workshop was organised to collect the feedback of RIS users, in particular skippers, on the contractor's remaining estimates on potential costs or expected benefits stemming from the proposed policy measures to update the RIS Directive. The workshop gathered four participants, drawing from the staff of enterprises providing inland navigation and logistics ICT, representatives of networks of private businesses and members of the shipping sector associations. The workshop was also joined by one representative by DG MOVE, and it was moderated by three participants from the contractor's side.

Agenda

The agenda included an introduction of all participants, an overview of the measures proposed with a particular focus on information required for voyage planning and, finally, a discussion on measures relating to the uptake of Smart Shipping concepts, especially (electronic) cargo reporting and voyage plan reporting.

Discussion

The discussion began with the contractor providing an overview of the proposed policy measures together with their impact on operations in the wheelhouse. One participant inquired into the way standards from the RIS Index should be seen in relation to the RIS standards developed by CESNI/TI. The contractor responded that while at present the RIS Directive has four annexes describing key technologies for RIS and the RIS Index is not mentioned by any of them, it would be desirable to include the RIS Index in a separate new annex. It was suggested by the participant that it would be better to add the RIS Index as part of the CESNI/TI standards since these are evaluated every two years, whilst a Directive is updated once in every twenty years. In view of the rapid technology changes that occur in the sector, the participant reckoned that a lack of frequent updates might result once again in obsolete legislation.

Since one of the impacts of an update of the RIS Directive is less energy consumption, one of the respondents asked the contractor to explain the methods used to calculate this reduction. In particular, the respondent held that the industry had already tried to prove the connection between RIS and energy consumption, but it was very hard in view of the lack of data. The contractor answered that calculations were based on a study carried out by Rijkswaterstaat, the executive agency of the Dutch Ministry of Infrastructure and Water Management, which used micro-simulations in corridor-management to assess the benefits of RIS for skippers when approaching locks. Research proved that, on these corridors, RIS had the potential to cut emissions by 5% to 13%. At an EU-level, this % was much lower, so

the contractor had found a credible estimates by averaging the national % and the EU-level %.

It was also mentioned that the impacts of electronic reporting were not clear. Some participants held that while ERI was expected to bring a decrease in the administrative burden for the government, in many areas skippers still have to report during their journey both electronically and via VHF, creating duplications.

The discussion then moved to voyage planning, and the contractor asked participants to list the elements that should be considered when organizing a voyage. Since the first sub-question related to the information that inland skippers need on network status, the contractor explained that network status may be anything relating to the network, such as notices to skippers indicating the available objects on the network or waiting times at locks. Stakeholders provided two kinds of responses, mentioning infrastructure and superstructure elements. Infrastructure elements revolve around considerations related to the facilities that are available for skippers when using inland waterways, whilst superstructure factors involve the organisational and administrative components of the transportation system.

For infrastructure elements, one respondent mentioned that prior to planning a voyage, skippers that are active in the tanker business would like to know whether terminals have the capacity to welcome them to unload their goods, or whether terminals have at least slots for the tankers to wait at. This is particularly important because tankers often transport dangerous goods that can only be kept onboard for a specific period of time, therefore in the absence of information on terminals' capacity or slot availability, skippers will rather be on the safe side and plan their voyage as scrupulously as possible, resulting in an increased administrative burden. The respondent argued that terminals have no incentive in sharing this information, and that the industry has had to adapt by finding other solutions such as developing UAB, a digital collaborative platform to obtain information on terminals and optimise handling operations. However, industry-based platforms run in parallel with RIS and ERI, creating inefficient duplications.

Two more aspects that were mentioned by stakeholders on the topic of infrastructure-related elements to be considered when planning a voyage revolve around water levels and the availability of covered areas to unload at terminals. As a matter of fact, long periods of draught result in the shipment of less containers, which in turn decreases the benefits of economies of scales for businesses. For this reason, skippers will be considerate in optimising their voyages on the basis of water levels. In addition, as some of the materials transported by tankers need to stay dry at all times, if a terminal does not possess covered areas that can be used by the vessels to unload its goods, skippers will not be able to dock there.

For what concerns the superstructure elements, one participant flagged that skippers often consider the swiftness of local administrations and port authorities. For example, in ports where authorities' offices are closed in the weekend, it is unlikely that the vessel will be able to promptly resume its voyage at the beginning of the week, and it is much more probable that administrative procedures will require the vessel to remain in the port until Tuesday. Customer clearance is also problematic, especially between EU and non-EU countries, and it would be useful to inform authorities in advance of the number of vessels coming to their port in order for them to optimise their personnel and handle requests more quickly.

In general, participants agreed that missing information-sharing is one of the main elements hampering efficient voyage planning. As reminded by one of the respondents, if a skipper wishes to optimise their voyage through searching routing algorithms based on other

surrounding vessels, the skipper will need to know where these vessels are located. However, some of this information cannot be legally acquired since many barge owners also live in their barges. A legal way to obtain this data would comprise of asking barge owners for their consent in sharing the information. Eventually, to actually improve voyage planning, the respondent argued that all of this information should be seamlessly integrated across Member States.

Moreover, one participant also suggested that systems such as UAB could be integrated with RIS, in order to allow everyone to access an overview of movements within ports. In this regard, it was noted that this would require a change in the RIS Directive to involve ports and terminals in its scope, and that it is very likely that certain commercial interests would oppose it. Nonetheless, it was also remarked that for ports are nodes for the purpose of network status, and it is impossible to exclude them from RIS. The contractor intervened by explaining that indeed it is acknowledged that information-sharing with ports is lacking, and to this end two of the proposed policy measures relate to ports.

The discussion on voyage preparation ended with the contractor's assumptions on voyage planning. Participants agreed that the assumptions were realistic, however they also added that the increasing captains' age should be factored in as an element making voyage planning times a bit longer. As a matter of fact, European captains are fifty years old on average and with limited digital skills. If platforms do not have a user-friendly interface, filing electronic reports will take a longer time.

Concerning the magnitude for measures impacting voyage preparation, similarly to what emerged in the previous stakeholder workshop respondents argued that mandating new standards and technical specifications for the exchange of information relating to IWT ports is a low magnitude measure, since there are already many industry-based standards that the RIS sector observes. The participants added that it would be sufficient to align existing standards among each other, to ensure consistency and harmonise information-exchange. In addition, one respondent held that enforcing information exchange through the RIS COMEX platform would be the measure with the highest magnitude.

The contractor asked participants to rank the importance of improving RIS-data for the uptake of Smart Shipping concepts. Smart Shipping concepts were defined as any element that make it easier to navigate the waterway, such as semi-autonomous or completely autonomous navigation. One of the stakeholders remarked the difference between semi-autonomous or hybrid navigation and completely autonomous navigation, holding that the impact of RIS-data on the two considerably differs. Other participants added that whatever level of automation is meant, the uptake of Smart Shipping concepts will not take place unless Member States provide the relevant physical and digital infrastructure (such as 4G and 5G infrastructure), and existing standards are made mandatory. The contractor also asked participants for their expectations on how many ships would be equipped with Smart Shipping technologies in a situation with no amendments of the RIS directive. Respondents commented that the answer depended on the actual definition of Smart Shipping technology, which is hard to provide from a regulatory point of view. It was concluded that, in any event, in the absence of radical infrastructural changes, the improvement of RIS-related data will not be sufficient in ensuring a quick uptake of Smart Shipping equipment.

9. List of interviewed stakeholders

Figure 49. List of interviewed organisations

Stakeholder category	Specific organisations	# of interviews
Shipping Regulation / Technical Certification Authority	World Association for Waterborne Transport Infrastructure (PIANC)	1
River Commissions	Central Commission for the Navigation on the Rhine (CCNR)	1
	Mosel Commission	1
	International Sava River Basin Commission	1
Other RIS related bodies	De Vlaamse Waterweg	1
	CESNI/TI/IECDIS	1
National RIS authorities	Via donau - Austrian Waterway Management Organisation (AT)	2
	Federal Department of the Environment, Transport, Energy and Communications (DETEC) (CH)	1
	Inland Navigation Office (PL)	1
	Inland Navigation Department (Ministry of Transport CZ)	1
	Austrian Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK)	1
	Rijkswaterstaat (NL)	3
	Czech Waterway Directorate	1
	Hungarian National Association of Radio Distress-Signalling and Info-communications (RSOE)	2
Professional Associations at the European Level	European Federation of Inland Ports	1
	Inland Navigation Europe	1
	European IWT Platform	1
	European Barge Union	1
	European Boating Association	1
	TTS (Transport Trade Services) GmbH	1
	ProDanube International	1
	Bureau Telematica Binnenvaart	1
	Periskal	1
	Smart Atlantis	1
	Argonics	1

Appendix 2. List of literature

Table 38: Literature list

Document type	Source
Legal, policy and strategic documents	CCNR Protocol 13 (2018)
	CCNR Protocol 18 (2017)
	Commission staff working document (2021) "Better Regulation Guidelines"
	Communication of the European Commission – A European Green Deal (2019)
	Communication of the European Commission "Towards a common European data space" (2018)
	Communication of the European Commission (2016) "EU eGovernment Action Plan 2016-2020: Accelerating the digital transformation of government"
	Communication of the European Commission (2020) "Sustainable and Smart Mobility Strategy – putting European transport on track for the future"
	Communication of the European Commission (2021) "NAIADES III: Boosting future-proof European inland waterway transport"
	Communication of the European Commission "Accelerating the digital transformation of government" (2016)
	Directive (EU) 2016/1629 of the European Parliament and of the Council of 14 September 2016 laying down technical requirements for inland waterway vessels established the rules for European Hull Data Base (EHDB)
	Directive (EU) 2017/2397 on the recognition of professional qualifications in inland navigation and repealing Council Directives 91/672/EEC and 96/50/EC
	Directive 2005/44/EC on harmonised river information services (RIS) on inland waterways in the Community
	Directive 2006/87/EC laying down technical requirements for inland waterway vessels and repealing Council Directive 82/714/EEC
	Directive 92/106/EEC on the establishment of common rules for certain types of combined transport of goods between Member States
	Directive 96/50/EC of 23 July 1996 on the harmonization of the conditions for obtaining national boat masters' certificates for the carriage of goods and passengers by inland waterway in the Community
	European Commission, A European Strategy for Data
	Inception IA (2020), Revision of Regulation on Union Guidelines for the development of the trans-European transport network (TEN-T)
	Inception IA for the initiative on the revision of EU rules on river information services (RIS) (2021)
	Proposal for a Regulation on European data governance (Data Governance Act) (2020)
	Regulation (EC) No 181/2008 laying down certain measures for implementing Council Regulation (EC) No 718/1999 on a Community fleet capacity policy to promote inland waterway transport
	Regulation (EC) No 414/2007 concerning the technical guidelines for the planning, implementation and operational use of river information services (RIS) referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community

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RIVER INFORMATION SERVICES (RIS)

Document type	Source
	Regulation (EC) No 415/2007 concerning the technical specifications for vessel tracking and tracing systems referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community Regulation (EC) No 416/2007 concerning the technical specifications for Notices to Skippers as referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community Regulation (EC) No 718/1999 on a Community-fleet capacity policy to promote inland waterway transport Regulation (EU) 2016/1628 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for nonroad mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 119, 4.5.2016, p. 1–88 Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network Regulation (EU) No 164/2010 on the technical specifications for electronic ship reporting in inland navigation referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community Regulation (EU) No 546/2014 amending Council Regulation (EC) No 718/1999 on a Community-fleet capacity policy to promote inland waterway transport Regulation (EU) No 909/2013 on the technical specifications for the electronic chart display and information system for inland navigation (Inland ECDIS) referred to in Directive 2005/44/EC of the European Parliament and of the Council Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC Resolutions CESNI 2018-II-17, 2019-I-3 and 2019-II-10 “CESNI 2019-2021 work programme (State: October 2019)”
Previous evaluations/studies	Andritsos Fivos (2016), eIWT, Electronic tool for Inland Waterways Transport Architecture, requirements & stakeholders' considerations, JRC, European Commission, JRC technical reports CCNR (2017) “Annual report 2017: Inland Navigation in Europe. Market Observation.” CCNR (2021) “Annual report 2021: Inland Navigation in Europe. Market Observation.” Central Commission for the Navigation of the Rhine (2017), Inland AIS devices and electronic chart display systems on the river Rhine - Analysis of the online survey conducted in the context of evaluating the implementation of the mandatory installation Central Commission for the Navigation of the Rhine (2018), Inland AIS devices and electronic chart display systems on the Rhine - Conclusions and recommendations in the context of evaluating the implementation of the mandatory installation Central Commission for the Navigation of the Rhine, Market observation reports - European inland waterway transport Central Commission for the Navigation of the Rhine, Market Report 2014-2017 -

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RIVER INFORMATION SERVICES (RIS)

Document type	Source
	Main features and trends of the European Inland Waterway Transport sector Commission Staff Working Document (2016) REFIT EX-POST EVALUATION of Combined Transport Directive 92/106/EEC Final Report Commission Staff working document (2018), Mid-term progress report on the implementation of the NAIADES II action programme for the promotion of inland waterway transport (covering the period 2014-2017) Commission Staff Working Document (2021), Evaluation of the Directive 2005/44/EC on harmonised RIS Commission Staff working document on digital inland navigation (2018) EC (2017) "New European Interoperability Framework: Promoting seamless services and data flows for European public administrations" European Commission (2017), European Commission (2017), New European Interoperability⁷³ Framework - Promoting seamless services and data flows for European public administrations European Commission, Platform for the implementation of NAIADES European Commission, Platform for the implementation of NAIADES (PLATINA II) German HAVARIS system, the German Average Analysis, research and Information System IMO (2014) "Third IMO Greenhouse Gas Study 2014". Available at: https://greenvoyage2050.imo.org/download-publications/ INCARNATION, among others determination of effects of RIS on safety INDRIS, Inland Navigation Demonstrator for River Information Services 1999, Offered a framework for cost/benefit analysis with example data INEA (2018), CEF support to Inland Waterways Ir. L.M. Punter (TNO) Dr. Ir. W.J. Hofman (TNO) (2017), Digital Inland Waterway Area - Towards a Digital Inland Waterway Area and Digital Multimodal Nodes IRIS Europe Consortium, IRIS Europe - Implementation of River Information Services in Europe – Final technical report (2009) IRIS Europe Consortium, IRIS Europe II - Implementation of River Information Services in Europe – Final technical report (2011) IRIS Europe Consortium, IRIS Europe II - Implementation of River Information Services in Europe – Final technical report (2015) Panteia (2014), Evaluation of RIS implementation for the period 2006-2011 – Main report Panteia (2014), Evaluation of RIS implementation for the period 2006-2011 – country reports PIANC, Guidelines and Recommendations for River Information Services (2019) PLATINA, 2012, RIS Implementation Support and Assistance, DG Move, 7th Framework Programme for RTD, DVS Quentin Liger, Mirja Gutheil, James Eager, Rory Tierney, Andrew Whitehead, Nikolas Reschen (2020), Identification of potential synergies/re-use of legislative framework with digital aspect and concrete informatics solutions in other transport modes such as road, rail, maritime or air transport for potential re-use in the inland waterway transport - final report RIS-COMEX, CoRISMa Results 1, 2, 3 STC-NESTRA and TNO (2018) "TASK D – Fact-finding study on the practical and operational measures in application of the RIS Directive" FINAL REPORT

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RIVER INFORMATION SERVICES (RIS)

Document type	Source
	Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS) (2020) UNECE (2011) "White paper on Efficient and Sustainable Inland Water Transport in Europe" UNECE (2020) "White Paper on the Progress, Accomplishments and Future of Sustainable Inland Water Transport" Vanessa Ludden, Dr. Karolina Wrona, Lara Jansen, Elisa Colaiacomo (Ramboll) Dr. Edwin Verbergh, Prof. Thierry Vanelslander, Prof. Edwin van Hassel (University of Antwerp) Linus Hoet (DLA Piper) (2020), Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS), Final Report
Academic literature	Christa Sys, Eddy Van de Voorde, Thierry Vanelslander, Edwin van Hassel (2017), De binnenvaart : traditionele modus, innovatieve toekomst? Antwerp, University of Antwerp, Faculty of Applied Economics, 2017, 26 p. (Research paper / University of Antwerp, Faculty of Applied Economics; 2017-004) Edwin van Hassel and Yasmine Rashed (2018), Analyzing the transport volume of the tanker barge market in the ARA - Rhine region. In The Port and Maritime Sector: Key Developments and Challenges: The Special Interest Group A2 (Ports and Maritime) of the World Conference on Transport Research Society (WCTRS), Antwerp, Belgium-p. 1-19 Edwin van Hassel, Thierry Vanelslander, Christa Sys (2017), Managing capacity in the inland waterway sector : to intervene or not to intervene? Inland waterway transport: challenges and prospects / Wiegmans, Bart; et al. - ISBN 978-1-138-82671-7 - Abingdon, Routledge, 2017, p. 71-98 Osama Al Enezy, Edwin van Hassel, Christa Sys, Thierry Vanelslander (2017), Developing a cost calculation model for inland navigation in Research in transportation business & management - ISSN 2210-5395 - 23(2017), p. 64-74 Neat et. al., (2011) "Medium and Long Term Perspectives of IWT in the European Union" Available at : https://cedelft.eu/wp-content/uploads/sites/2/2021/04/4330_IWT_EU_main_report_1326970049.pdf
Other	A Europe fit for the digital age. Priorities 2019-2024. European Commission. Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age A European Green Deal. Priorities 2019-2024. European Commission. Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en AUTOSHIP. Available at: https://www.autoship-project.eu/ CESNI website, available at: https://ris.cesni.eu/ Climate change. EU topics. Inland Navigation Europe. Available at: https://www.inlandnavigation.eu/eu-topic/climate-change/ Competition and innovation in land transport. Innovation. OECD. Available at: https://www.oecd.org/fr/innovation/competition-and-innovation-in-land-transport.htm CoRISMa. RIS COMEX. Available at: https://www.riscomex.eu/how-it-began/ EEA (2021) "Greenhouse gas emissions from transport in Europe" Available at: https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport EFIP (2017) "Digitalisation and Inland Ports" Position paper. Available at: https://www.inlandports.eu/views/digitalisation-and-inland-ports European Commission (2021), Statistical pocketbook 2021. Mobility and Transport. European Commission. Available at:

IA SUPPORT STUDY FOR THE REVISION OF DIRECTIVE 2005/44/EC ON HARMONISED
RIVER INFORMATION SERVICES (RIS)

Document type	Source
	https://transport.ec.europa.eu/index_en Mobility Strategy. Mobility and Transport. European Commission. Available at: https://transport.ec.europa.eu/transport-themes/mobility-strategy_en Open data – availability of public datasets. European Commission. Available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/9011-Open-data-availability-of-public-datasets_en RIS COMEX. Available at: https://www.riscomex.eu/ TENTec Public Portal. European Commission. Available at: https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/site/index_en.htm TINA Office (1998) “Status of the Pan-European Transport Corridors and Transport Areas.” Corridor Status Report. Trans-European Transport Network (TEN-T). Mobility and Transport. European Commission. Available at: https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en UNECE (2020) “IWT in the COVID-19 Crisis” Working Party on Inland Water Transport. Informal document SC.3 No. 7. Available at: https://unece.org/fileadmin/DAM/trans/doc/2020/sc3/ECE-TRANS-SC3-2020-inf_07e.pdf Van Honacker, H. (2018) “Naiades 2 Mid-term progress (2014-2017)” EMMA project conference presentation on 6 November. White paper 2011. Mobility and Transport. European Commission. Available at: https://transport.ec.europa.eu/white-paper-2011_en European Maritime Safety Agency (EMSA). European Union. Available at: https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/institutions-and-bodies-profiles/emsa_en

Source: elaboration of the contractor (2022)

Appendix 3. Detailed description of policy measures

Measure 1: Increase the harmonisation of RIS through guidelines

This measure affects waterway authorities, inland navigation personnel and ship owners as well as IT service providers to inland navigation. Waterway authorities would have to adapt their data architecture as a result of the guidelines. We defined an estimate of a margin of compliance based upon the targeted interviews. This leads to one-off investment costs.

The services of the IT service providers are facilitated (i.e. leading to more uniformity of data across countries) and this can lead to lower service costs for the inland navigation operators. In addition, the travel preparation costs and the administrative burden during the trip for inland navigation are simplified. Therefore, the main impacts of this measure would be of an economic nature. In addition, it might result in positive social impacts as a consequence of better harmonisation of information related to IWT, possibly reducing, for example, the number of accidents.

Measure 2: Introduce a harmonised complaint mechanism (in Member States)

This measure affects Member States and RIS users. As a result of this measure, costs would be incurred by the Member States to deal with the complaints. On the other hand, there are also benefits. The complaints mechanism should ensure that Member States comply better with the Directive. In this respect, we mainly foresaw benefits related to administrative burdens for IT service providers or barges; the complaint mechanism should lead to a better availability of information and better information quality. Therefore, the measure would involve economic impacts in the form of recurring costs and one-off investment costs for European RIS-authorities; however, it would also considerably improve voyage planning for inland shippers and help navigation software suppliers report the incorrect data more easily.

Measure 3: Introduce a new Performance Measurement Framework

This measure mainly affects Member States, navigation software providers, RIS users and skippers. CESNI would develop a number of indicators that would be reported to the EC, which would then check if RIS is applied properly. This measure would mean that the Member States incur costs to collect the necessary data. On the other hand, there would also be benefits. The framework must ensure that Member States comply better with the Directive. In this respect, we foresee that the increased compliance would lead to a better availability of information and better information quality leading to improved RIS in general as a consequence. The measure would entail economic impacts for Member States, it would decrease the subscription fee of navigation software and, finally, it would reduce costs in voyage planning for skippers.

Measure 4: Strengthen requirements for RIS standards by adding new standards on data for navigation and voyage planning (RIS Index)

This measure affects RIS authorities, IWT users and navigation personnel. It leads to investment costs and recurrent costs on the part of waterway operators and ports, as they are obliged to supply reference data about the waterways.

The inland shipping sector can benefit from this. At the moment it is very difficult for inland shipping companies and IT services in inland shipping to find good data, especially when it comes to international journeys. One of the examples is that different definitions are used at notices to skippers. When new standards are added and less freedom to different interpretations, the travel plan is facilitated. It would be easier for IT service providers to

collect the right data and distribute it to the sector. On the side of IT service providers, this would lead to lower costs that can possibly be passed on to the sector. For the inland waterway sector, better reference data leads to easier voyage planning and possibly higher productivity. Moreover, it is possible that journeys will be more efficient, especially if standards are added that oblige waterway managers to provide insight into current waiting times at locks and occupation of berths on busy waterway corridors. This makes it possible to book energy savings or to reduce the number of vessel kilometres (when looking for a berth). Better quality of objects would also lead to an impact on safety.

Altogether, the measure involves potential innovation impacts, eventually leading to a higher modal shift towards IWT. It could result in environmental impacts with important reductions in CO₂ emissions and air pollutant levels. Furthermore, it would have social impacts in terms of improving safety by reducing the number of accidents. However, it would also involve economic impacts in terms of costs both for RIS authorities and for European waterway operators.

Measure 5: Require electronic voyage plan reporting

This measure affects RIS authorities, inland navigation users and skippers. It would make it mandatory for inland skippers to report their voyage plan (ERIVoy), providing more accurate feedback on waiting times at locks and advised navigation speeds. The measure would lead to an increased administrative burden for the inland shipping sector, but also to a better traffic image for the authorities and thus better information feedback to the sector. This in turn can lead to planning improvements (less waiting, less energy consumption), resulting in higher productivity and lower energy consumption (and related emissions). Overall, the measure would bring economic impacts for RIS authorities, (in view of the one-off investment costs and recurring adjustment costs) and for skippers (in light of the administrative burden to report electronically voyage plans). However, it would also involve transport costs savings for inland navigation users, and eventually result into environmental and social positive impacts.

Measure 6: Introduce provisions for supplying data to the ERDMS and its operation

This measure mostly affects RIS users and navigation service providers. With this measure, it would be easier for IT service providers to collect the right data and pass it on to the industry. On the IT service providers' side, this would lead to lower costs that could be passed on to the sector (inputs: number of ships). For waterway authorities, this would mean an extra administrative burden (i.e. every data update would have to be transmitted to the ERDMS). A large number of waterway authorities already do so; the measure would involve some economic impacts in the form of recurring adjustment costs for RIS authorities, however it would also result in costs reductions for suppliers of navigation software and in positive social impacts thanks to the availability of more navigational data.

Measure 7: Encourage cargo-related information exchange through eFTI mechanism

This measure would affect waterway authorities, ship operators, inland navigation personnel, and inland navigation IT service providers. Authorities would have to adapt their data flows and therefore make one-off investments and maintain the systems. Inland navigation personnel (including skipper-owners) would have to adapt their data tools to the new requirements; this will require one-off investments and, in some cases, also yearly costs for updates.

. Information exchange is now fragmented. Member States and Waterway Authorities now do not always forward electronic ship reports and Notices to Skippers from foreign countries are barely available on the websites of waterway administrations. RIS-Comex is a useful

tool in this perspective and might result into positive changes. IT service providers would have to adapt their product (one-off investment) but may then be able to provide their services more easily.

This measure would involve economic impacts for the RIS authorities; however it would also greatly reduce the administrative burden on inland navigation shipping skippers.

Measure 8: Mandate cargo-related information to be exchange through the eFTI mechanism

This measure would enforce Member States to exchange cargo related information (ERINOT) through the eFTI mechanism. It affects waterway authorities, ship operators, inland navigation personnel and inland navigation IT service providers. The calculation methodology is the same, information from the survey mainly influenced the effectiveness of the measure (how many (cross-border) trips are affected). In case of enforcement of information exchange of all RIS-information through the eFTI mechanism the effect would be 100%, whereas in case of encouragement the effect would be of a lesser extent. We estimated the number of MS/WA based upon the inputs from targeted interviews and their participation in previous RIS-related CEF-projects. The measure would result in the same sort of impacts as Measure 7.

Measure 9: Enforce information exchange through the RIS COMEX platform

This measure would require Member States to exchange information through the RIS COMEX platform. RIS COMEX was a CEF funded multi-beneficiary project aiming at the definition, specification, implementation and sustainable operation of Corridor RIS Services. Following the project conclusion in 2022, the 13 participating Member States⁶⁹ of the connected European Inland Waterway Network and their authorities continue the use of the system under a separate European Corridor Management Agreement⁷⁰. The result of the RIS COMEX project is thus currently used on a voluntary basis by the Member States that apply RIS, as a one stop shop of exchange of data. For example, through the EuRIS - European River Information Services platform (www.eurisportal.eu) waterway users can plan their travel and arrival times across Europe in one environment, without the need to consult numerous websites and information sources (especially when crossing borders). The project is entering a second phase (RIS COMEX 2) as in June 2023 it was selected for CEF funding with Poland joining as a partner. This indicates the interest of the Member States to continue with this platform as a basis for RIS. RIS COMEX 2 shall continue the work of the first stage (RIS COMEX) by extending the quantity and quality of the related services and provided data, by extending the geographical scope to additional waterways and even to additional countries (Poland), as well as by focusing on interconnections and integrations of existing systems and services.

Measure 10: Involve CESNI in the development and adoption of technical specifications

To ensure faster development of standards, this measure will designate CESNI (the European Committee for drawing up standards in the field of inland navigation) as the relevant body for developing RIS related standards. CESNI has already been designated as a

⁶⁹ The current partnership consists of the following countries: Austria, Belgium, Bulgaria, Croatia, Czechia, France, Germany, Hungary, Luxembourg, the Netherlands, Romania, Serbia and Slovakia.

⁷⁰ The agreement defines the governance structure, financing, sharing of costs, and other elements such as the "Partnership Coordinator" who manages the platform.

standard setting body in Directive (EU) 2016/1629 on Technical Requirements for inland waterway vessels and Directive (EU) 2017/2397 on professional qualifications in inland navigation.

This measure affects the working group of CESNI, possibly the European Commission, and RIS users. However, all effects of RIS for this measure are indirect so it is not possible to determine the impacts for this measure directly. .

Measure 11: Link RIS requirements with those of the TEN-T Regulation

This measure would seek at aligning the scope of the RIS Directive with the scope of the TEN-T Regulation. Currently, all interconnected waterways of CEMT class IV and higher (which refers to the size of the vessel they can accommodate) are within the scope of the RIS Directive. Member States may decide to include further waterways in this scope (for example Italy, Spain and Portugal). This scope does not match the TEN-T network, which with its current proposed revision will not refer any more to CEMT classification but will be based on the characteristics of the waterways themselves.

Under PM11, the scope of the RIS Directive is aligned with that of the TEN-T Regulation, which corresponds to the waterways of international importance. The waterways currently in the scope of the RIS Directive have a length of 14,400 km while the waterways under TEN-T have a length of 13,000 km. As a consequence, up to 1,400 km of waterways would potentially not be covered by the RIS provisions. Under this measure, Member States would still be able to voluntarily extend the RIS requirements to other parts of their network beyond what is in the TEN-T network.

Measure 12: Develop new standards and technical specifications for the exchange of information relating to IWT ports

This measure affects authorities, RIS users and skippers. It consists of the development of new standards and technical specifications for the exchange of information relating to IWT ports. Currently, many data relating to ports are not unlocked, resulting in areas labelled as empty or as “caution areas” on maps. By developing new standards and technical specifications for the exchange of information relating to IWT ports, there would be better data quality for all, leading to simpler travel planning. The economic impacts of the measure would mainly affect European ports in view of the one-off investment cost for implementing the new standards. However, the measure would allow for a reduction in the administrative burden for inland shippers thanks to the decrease of renotification requirements through ERI, (currently electronic cargo reports are not passed to inland ports).

Measure 13: Mandate new standards and technical specifications for the exchange of information relating to IWT ports

This measure affects port authorities, navigation software suppliers and inland shippers. In contrast to PM12, where the exchange of information is voluntary, this measure will require that the exchange of certain data (transshipment capacity, availability of alternative fuels, availability of berths, etc.) between vessels and IWT ports uses the new standards and technical specification.

Measure 14: Improve harmonisation between RIS and information services for other modes of transport (e.g. maritime)

This measure affects authorities, RIS users and skippers. It would envisage that for the next revision of the implementing acts providing the technical guidelines for the planning, implementation and operational use of the services (i.e. RIS Guidelines), information services for other modes of transport would be considered to improve coherence and consistency of legislation in different transport domains and to ensure the interoperability of these services. As a result of the measure, we foresee effects that lead to an increased demand for inland waterway transport through a better integration in the multimodal supply chain. With this measure, the modal shift to IWT would decrease the overall emissions by the transport sector. For waterway authorities and ports, there would be costs. The measure would involve economic impacts for the public sector, with a large one-off investment cost. However, it would also result in environmental benefits and reduce accidents, therefore improving safety.

Measure 15: Require sharing of all necessary cross-border data for traffic management and transport management by Member States

This measure affects RIS authorities and RIS users. It aims at facilitating the international exchange of other RIS-related data, affecting nearly all stakeholders in inland navigation. For instance, authorities would have to adapt their services to inland navigation and incur additional costs. Inland navigation operators would have easier access to relevant international information on navigational conditions. Their navigation systems would have to be adapted to this, but after that, travel preparations would be easier. The surveys and targeted interviews enabled us to find out whether this results in investment costs for inland skippers and, if so, what these costs will be. Furthermore, the improved provision of information would make it possible to plan journeys more accurately and faster. The measure would result in economic impacts in terms of one-off investment cost for RIS authorities. However, it would also allow Member States to save on public administrative burdens and reduce private administrative burdens for RIS users.

Measure 16: Specify more clearly the cases for exchange of personal data

This measure affects authorities and RIS users. It would mainly lead to costs on the side of the waterway managers. The surveys and targeted provided insight into the extent of these costs. In this respect, lessons can be learned from the RIS-COMEX, VISURES and *Rijkswaterstaat* systems for exchanging AIS data. On the private side, better data exchange may lead to logistic benefits. Overall, the measure would result into economic impacts for authorities, but also decrease the administrative burden for collecting port charges.

Measure 17: Develop templates and standards for the exchange of personal data

This measure affects port authorities, RIS users and skippers, but it has consequences for almost all stakeholders in inland navigation. Authorities would have to adapt their services

to inland navigation to the templates and incur additional costs. This measure would mainly result into economic impacts in view of the one-off investment cost by inland ports, and the recurrent costs for management and maintenance costs of the data.

Appendix 4. IWT developments up to 2020

This section looks at the historical development of important aspects of IWT including the number of units transported in inland navigation, the number of trips, the average distance travelled, the number of border crossings and the number of accidents up to 2020. The aim is to establish trends that show the development of IWT and that can support the analysis. An attempt to estimate missing values has been made where data were incomplete or unavailable.

Number of units transported in inland navigation

Freight transport

The table below shows the number of tonnes transported in inland navigation in 2015 and 2020.

Table 39: Number of tonnes transported in inland navigation in 2015 and 2020

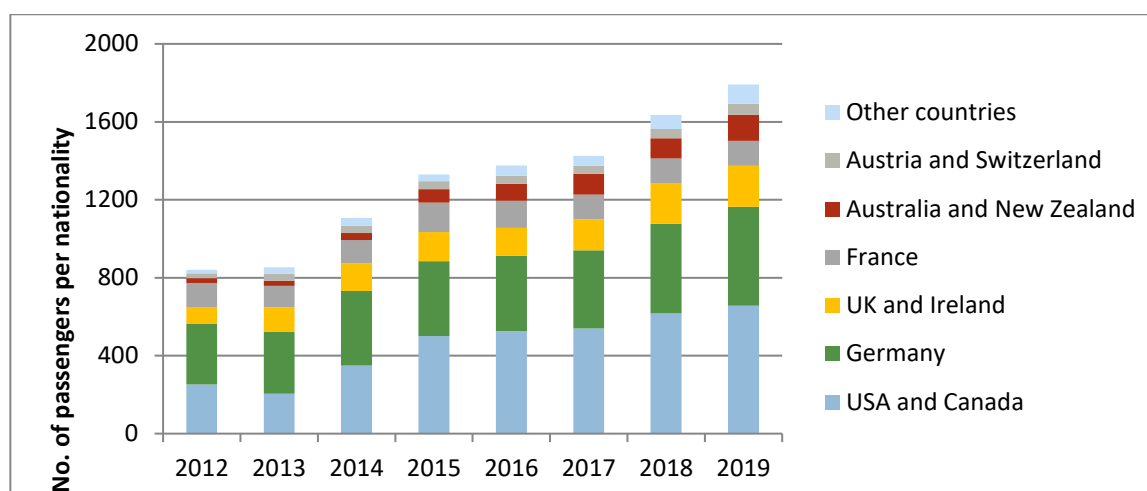
TIME	2015	2020	
GEO (Labels)			
European Union - 27 countries (from 2020)	544,887	505,526	
European Union - 28 countries (2013-2020)	548,953	:	
European Union - 27 countries (2007-2013)	548,755	:	
European Union - 25 countries (2004-2006)	525,408	:	
European Union - 15 countries (1995-2004)	516,530	:	
Belgium	188,158	156,131	
Bulgaria	17,201	18,924	
Czechia	850	397	
Germany (until 1990 former territory of the FRG)	221,369	188,022	
France	63,094	55,979	
Croatia	6,642	7,077	
Italy	379	859	
Lithuania	68	9	
Luxembourg	7,106	5,755	
Hungary	8,163	8,803	
Netherlands	359,898	349,006	
Austria	8,599	8,247	
Poland	5,036	2,517	
Romania	30,020	30,518	
Slovakia	5,721	6,004	
Finland	503	512	
Sweden	:	904	d
United Kingdom	4,065	:	

Source: IWW_GO_ATYGO

Passenger transport

Figure 50 shows the number of passengers on European river cruise vessels. A distinction is made between the nationalities of the passengers.

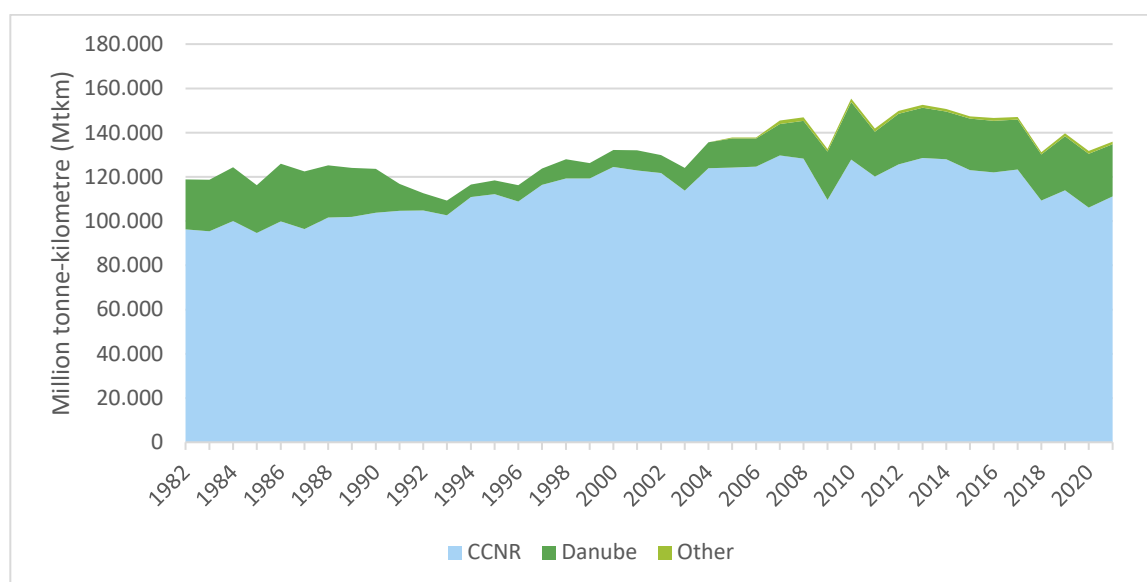
Figure 50: Number of passengers on European river cruise vessels per nationality



Sources: SeaConsult, IG River Cruise (2019), Der Fluss-Kreuzfahrtmarkt 2019.

To convert these numbers into transport performance, an average distance travelled for a river cruise must be determined. We have estimated this at 350 kilometres, which is the result of a weighted average between distance and number of daytrips and distance and number of longer river cruises, typically 7 days.

Figure 51: Development of transport performance of IWT (tonne*kilometre)



Source: Eurostat, table IWW_GO_QNAVE (full availability for CCNR countries since 1982, full availability for Danube countries since 2005 – earlier years based on statistics of the Danube Commission).

Number of trips in inland navigation

The number of trips in inland navigation is determined by dividing the number of tonnes transported by the average number of tonnes transported per sailing movement (loaded & empty). Belgium, Czech Republic, Luxembourg, Hungary, Austria and Romania publish this

data. The German statistical office Destatis only gives the number of loaded trips; the Dutch Rijkswaterstaat has the number of ship movements in the Netherlands available in the "Binnenvaart Analyse Systeem" (BIVAS). This results in the table below.

Table 40: Number of trips in inland navigation

TIME	2015	2020
Belgium	288,344	228,317
Bulgaria	n/a	n/a
Czechia	1,388	432
Germany (until 1990 former territory of the FRG)	295,423	276,503
France	100,000	n/a
Croatia	n/a	n/a
Italy	n/a	n/a
Lithuania	n/a	n/a
Luxembourg	6,578	n/a
Hungary	9,988	9,307
Netherlands	412,191	378,568
Austria	13,408	12,344
Poland	n/a	n/a
Romania	25,563	n/a
Slovakia	n/a	n/a
Finland	n/a	n/a
Sweden	n/a	n/a
United Kingdom	n/a	n/a

Source: various, see text

The numbers per country may not add up, as a large number of trips are international. After all, the Netherlands also reports journeys over its territory from Belgium to Germany or vice versa. Further, missing data has been completed, based on the total volume of freight in Europe and the average tonnage per transport movement.

The table below shows the average distance travelled (in kilometres) per tonne per country in 2015.

Table 41: Average distance travelled (in km) per tonne per country in 2015

Country	Distance travelled (km)
Belgium	55
Bulgaria	325
Czechia	39
Germany (until 1990 former territory of the FRG)	250
France	135
Croatia	132
Italy	164
Lithuania	-
Luxembourg	33
Hungary	223
Netherlands	135
Austria	210
Poland	17
Romania	439
Slovakia	130
Finland	254
Sweden	
United Kingdom	30

Source: Panteia calculation

Eurostat does not collect data on the transport performance of inland passenger shipping. We have used data provided by the Central Commission for Navigation on the Rhine for the number of passengers in river cruise transport.

Number of border crossings in inland navigation

The number of border crossings in inland navigation has been determined using the Eurostat table *iww_go_atygo*. This table shows the number of flows (in tonnes and tonne-kilometres) per country. Tonnages have been converted into trips by taking the average tonnage per country for the two countries between which the border is crossed. Tonnages have thus been converted into trips between countries. Based on the inland waterways network, the number of border crossings has then been determined.

Number of ship kilometres

The total number of ship kilometres in a year is (1) the number of kilometres travelled per ship in that year, aggregated over (2) the number of ships per country, aggregated over (3)

the number of countries. The number of ship kilometres sailed is partly known from Eurostat. Belgium, the Czech Republic, Luxembourg, Hungary and Romania published information on the number of ship kilometres.

Table 42: Number of ship kilometres (*1000 kilometres)

TIME	2015	2020
Belgium	n/a	12,311
Bulgaria	n/a	n/a
Czechia	46	31
Germany (until 1990 former territory of the FRG)	n/a	n/a
France	n/a	n/a
Croatia	n/a	n/a
Italy	n/a	n/a
Lithuania	n/a	n/a
Luxembourg	218	n/a
Hungary	2,157	2,122
Netherlands	n/a	n/a
Austria	n/a	n/a
Poland	n/a	n/a
Romania	13,157	n/a
Slovakia	n/a	n/a
Finland	n/a	n/a
Sweden	n/a	n/a
United Kingdom	n/a	n/a

Source: various, see text

For countries where data is not available, the number of ship kilometres was estimated. This was done in the following way:

- The average tonnage per transport movement was determined. This can be determined by dividing the number of tonnes (IWW_ATYGO) by the number of voyages (iww_tf_vetf). Missing data have been added (Bulgaria based on Romania, Croatia based on Hungary, based on similarity in the waterway network of these countries)
- The number of ship kilometres is defined by the number of tonne-kilometres divided by the tonnage per transport movement

This leads to the overview of the number of ship kilometres in Table 45 below.

Table 43: average tonnage per transport movement

TIME	2015	2020
Belgium	653	684
Bulgaria	1,174	1,250
Czechia	612	919
Germany (until 1990 former territory of the FRG)	749	791
France	631	661
Croatia	817	946
Italy	600	600
Lithuania	250	250
Luxembourg	1,080	1,120
Hungary	817	946
Netherlands	873	922
Austria	641	668
Poland	612	919
Romania	1,174	1,250
Slovakia	817	946
Finland	1,000	1,000
Sweden	1,000	1,000
United Kingdom	1,000	1,000

Source: Panteia calculation

Table 44: overview of the number of ship kilometres (*1000 kilometres)

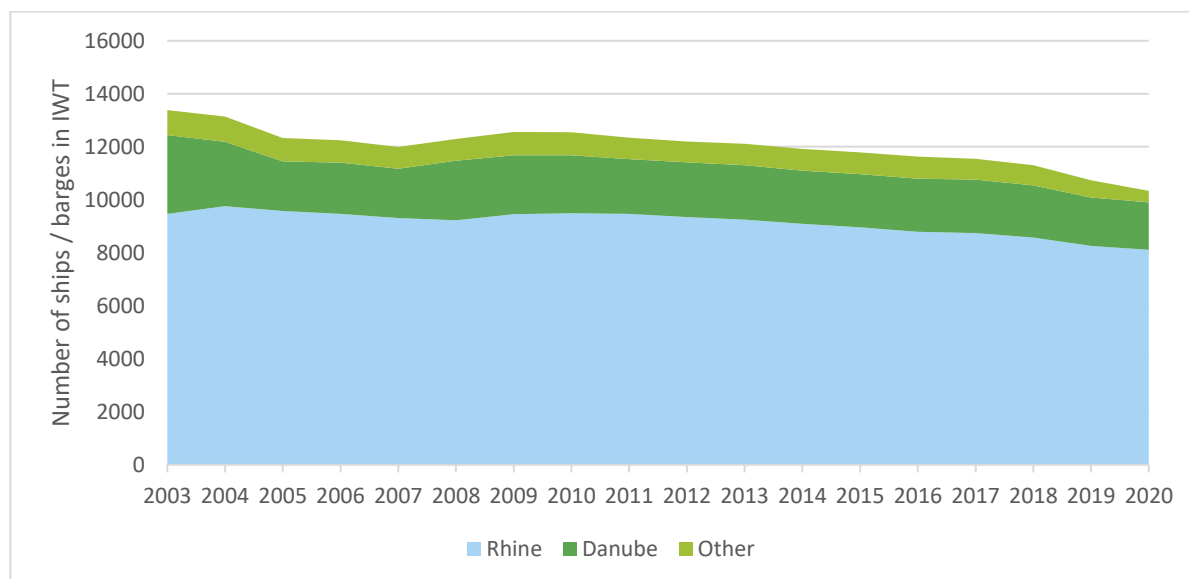
TIME	2015	2020
Belgium	15,977	12,311
Bulgaria	4,764	5,005
Czechia	46	31
Germany (until 1990 former territory of the FRG)	73,819	58,568
France	13,497	10,569
Croatia	1,076	955
Italy	103	207
Lithuania	0	0
Luxembourg	218	179
Hungary	2,157	2,122
Netherlands	55,587	48,992
Austria	2,816	2,404
Poland	144	84
Romania	13,157	10,910
Slovakia	907	882
Finland	128	127
Sweden	79	79

Source: Panteia calculation

Development of the fleet: number of ships/barges in fleet

The number of ships/barges in the fleet was determined for the base year on the basis of the market observation of the Central Commission for Navigation on the Rhine and data from Eurostat, see the graph below.

Figure 52: Number of ships / barges in IWT

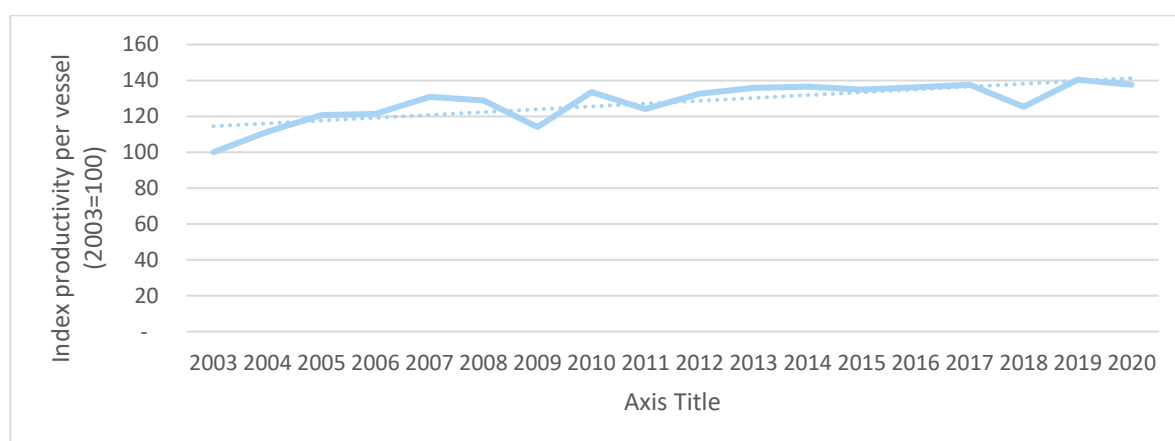


Source: Eurostat and CCNR

The development in the number of ships was then compared with the development of the transport performance in inland navigation.

In this way, we gained insight into the number of tonne-kilometres transported by ship/barge. In 2003, the average transport performance per ship/barge was 926,000 tonne-kilometres. In 2019, this had increased to 1.3 million tonne-kilometres per ship. This means a 40% increase in productivity per ship (an average of 2.1% per year). The graph below shows the growth in productivity per vessel in inland navigation between 2003 and 2020.

Figure 53: Index productivity per ship (2003=100)



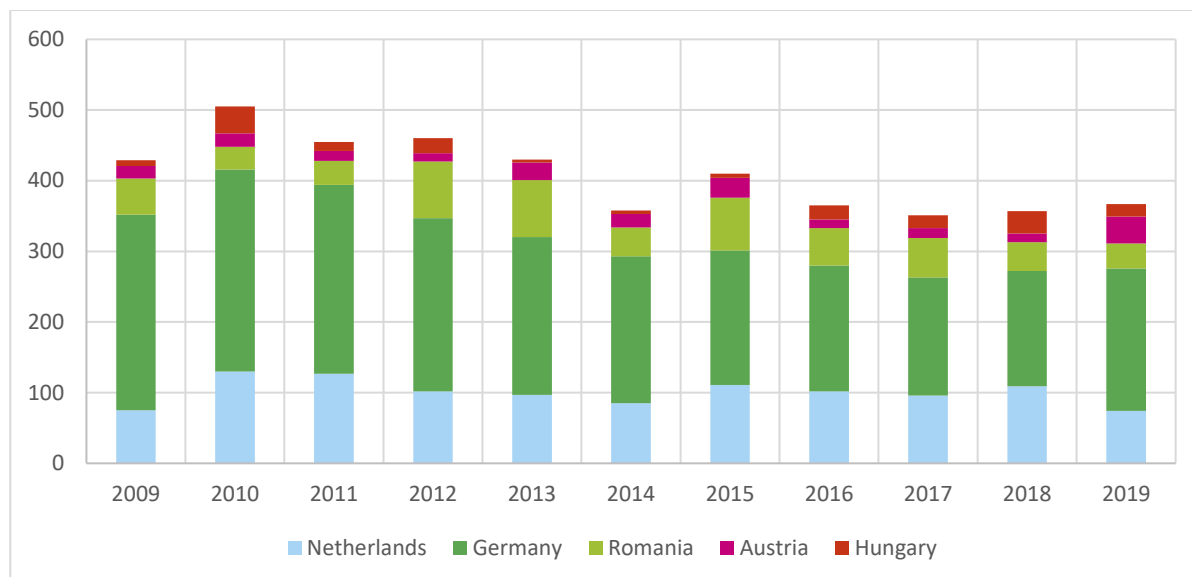
Source: Eurostat and CCNR

The graph shows that low water years such as 2003, 2011 and 2018 can have a considerable negative effect on productivity. A higher frequency of drought years is considered when estimating future productivity growth. Therefore, we estimated that the growth in productivity will be 1.5% per year. That is, per ship/barge the transport performance increases by 1.5% per year.

Development number of accidents

The following graph shows the development of the number of accidents in the Netherlands, Germany and (for the total) on the Danube per year.

Figure 54: Number of accidents



Source: Eurostat and Rijkswaterstaat

For countries where figures are available the average ratio is 2.2 accidents per million vessel-km. This ratio is used to calculate the number of accidents for the countries where no data is available.

Table 45: Vessel kilometres and accidents in 2015

TIME	2015	
	Vessel km	Accidents
GEO (Labels)		
European Union - 27 countries (from 2020)		35
European Union - 28 countries (2013-2020)		1
European Union - 27 countries (2007-2013)		12
European Union - 25 countries (2004-2006)		90
European Union - 15 countries (1995-2004)		29
Belgium	15,977	2
Bulgaria	4,764	0
Czechia	46	0
Germany (until 1990 former territory of the FRG)	73,819	0
France	13,497	6
Croatia	1,076	111
Italy	103	28
Lithuania	0	8
Luxembourg	218	75
Hungary	2,157	2
Netherlands	55,587	0
Austria	2,816	0
Poland	144	0
Romania	13,157	35
Slovakia	907	1
Finland	128	12
Sweden	79	90
United Kingdom		29

Source: Eurostat and Rijkswaterstaat, additional data calculated by Panteia

The average ratio was then applied to the number of predicted vessel kilometres.

Appendix 5. Assessment of impacts

This section describes the impacts of the various policy measures as covered by the study. Firstly, the baseline is established, followed by a discussion of the impact of each of the measures.

5.1 Establishing the baseline

Evolution of transport performance

In the Baseline scenario, EU transport activity is projected to grow post-2020, following the recovery from the COVID pandemic. Road transport would maintain its dominant role within the EU by 2050. Rail transport activity is projected to grow significantly faster than for road, driven in particular by the completion of the TEN-T core network by 2030 and of the comprehensive network by 2050, supported by the CEF, Cohesion Fund and ERDF funding, but also by measures of the 'Fit for 55' package. Freight rail traffic would increase by 42% by 2030 relative to 2015 (96% for 2015-2050). Freight inland waterways activity represented 147 billion tonne-kilometres (tkm) in 2015, going down to 132 billion tkm in 2020⁷¹. Following the post-COVID recovery, the freight inland waterways activity is projected to increase to 178 billion tkm in 2030 (21% increase relative to 2015) and 212 billion tkm in 2050 (44% increase for 2015-2050)⁷².

Table 46: Projected inland waterways activity at EU level in the baseline scenario (in billion tkm/pkm)

	2015	2020	2030	2040	2050
IWT freight (billion tkm)	147	132	173	195	212
IWT passenger (billion pkm)	0.5	0.04	0.6	0.7	0.7

Source: Elaboration of the contractor (2023)

The projected evolution of freight inland waterways activity by Member State is provided in Table 47. The highest shares of the freight inland waterways activity post-2030 are projected in Germany (around 40% of the total), the Netherlands (around 30%), Romania (around 11%), Belgium (around 7%) and France (around 5%). The other Member States would provide less than 5% of the freight inland waterways activity from 2030 onwards.

⁷¹ Source: [Statistical pocketbook 2022 \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&plugin=1)

⁷² PRIMES-TREMOVE model provides the projections for inland waterways and domestic maritime at aggregate level. No split is available between the two. This is due to the fact that energy balances do not distinguish between the two modes (their energy use is provided together). In order to derive the transport activity for freight inland waterways, the share of inland waterways activity in total inland waterways and domestic maritime activity from Eurostat has been used. Post-2020, the share of inland waterways activity is assumed to remain constant over time at its 2020 levels, in line with historical developments.

Table 47: Projected inland waterways activity by Member State in the baseline scenario (in billion tkm)

	2015	2020	2030	2040	2050
DE	55.32	46.34	69.94	76.77	85.29
NL	48.54	45.17	54.13	58.06	61.99
RO	13.17	13.64	19.32	21.26	23.57
BE	10.43	7.39	12.27	13.59	14.54
FR	8.52	6.99	8.30	8.61	8.74
BG	5.60	6.26	6.33	7.29	7.95
AT	1.81	1.61	2.41	2.55	2.59
HU	1.82	2.00	2.53	3.11	3.40
HR	0.88	0.90	1.12	1.33	1.46
SK	0.74	0.83	1.00	1.08	1.15
LU	0.24	0.20	0.27	0.33	0.36
FI	0.13	0.13	0.16	0.18	0.20
IT	0.06	0.12	0.15	0.16	0.16
SE	0.00	0.08	0.10	0.12	0.13
PL	0.09	0.08	0.15	0.21	0.24
CZ	0.03	0.02	0.04	0.04	0.05
EU	147.35	131.74	178.21	194.69	211.82

Source: Elaboration of the contractor (2023)

The passenger segment of IWTs is expected to increase as well (see Table 46), with the number of passenger-kilometres projected to increase by 36% by 2030 compared to 2015 (53% increase for 2015-2050)⁷³. The number of passengers on cruise vessels for the historical period is based on data from CCNR⁷⁴. The activity in terms of passenger-kilometres has been derived assuming an average sailing distance per passenger in inland navigation of 350 kilometres.

Despite the increase in terms of transport volumes, the modal share of freight IWT in land transport⁷⁵ is projected to decrease from 6.8% in 2015, to 6.5% in 2025 and 6.3% in 2030. Post-2030, the modal share of freight IWT is projected to remain relatively stable over time, at 6.2% of land transport activity. The decrease in the market share of IWT relative to 2015 is due to the specific type of goods transported by inland navigation, i.e. petroleum products and coal that are expected to decrease their share over time driven by the energy transition, but also due to the higher growth in the rail transport activity. Although growth is expected in the container segment, this growth is only projected to counterbalance the decrease in fossil fuels trade post-2030. As regards passenger transport, the modal share of IWT only represents around 0.01% of land transport activity and is projected to remain relatively stable over time following the post-COVID recovery.

⁷³ For the projection period, the passenger IWT activity is assumed to grow in line with that of inland waterways and domestic maritime activity from the PRIMES-TREMOVE model, while also considering the increasing share of passenger IWT between 2015 and 2019.

⁷⁴ Source: https://www.ccr-zkr.org/files/documents/om/om20_II_en.pdf

⁷⁵ Excluding pipeline transport.

The number of passenger vessel journeys is derived based on the projected evolution of activity in passenger-kilometres, assuming an average sailing distance per passenger in inland navigation of 350 kilometres and an average capacity of vessels of 150 passengers⁷⁶. In the baseline scenario, the number of passenger vessel journeys is projected to increase from 8,867 in 2015 to 12,043 in 2030 and 13,572 in 2050 following the recovery from the COVID-19 pandemic (see Table 48).

The total number of freight vessels journeys is estimated as the total number of tonnes transported by IWT divided by the number of tonnes transported per journey. The total number of tonnes transported is projected to grow roughly in line with the transport activity in tonne kilometres (from 545 million tonnes in 2015 to 690 million tonnes in 2030 and 813 million tonnes in 2050), while the number of tonnes per journey would continue to increase but at a slower pace than in the past⁷⁷. For 2015 the total number of freight vessels journeys was estimated at 682,120, going down to 588,721 in 2020. Around 60% of vessels journeys took place within the Netherlands. Post-2020, the number of freight vessels journeys is projected to go up to 717,838 in 2030 (5% increase for 2015-2030) and 731,234 in 2050 (7% increase for 2015-2050), following the recovery from the COVID-19 pandemic.

Around 40% of the freight vessels journeys take place within one country, with the rest crossing on average 1.3 borders per journey. This means that in many cases these are journeys between neighbouring countries (e.g. the Netherlands-Belgium or the Netherlands-Germany) and to a much lesser extent journeys that pass through three or more countries (e.g. Belgium-the Netherlands-Germany or Ukraine-Romania-Bulgaria). The share of border crossings in the number of vessel journeys is assumed to remain constant over time (at around 60%), in line with the historical developments. Thus, the total number of freight border crossings is projected to go up from 427,947 in 2015 to 432,442 in 2030 and 440,512 in 2050. For passenger vessels journeys, the share of border crossings is much higher (around 90%) and is assumed to remain constant over time. The total number of border crossings for passenger IWT is projected to increase from 8,344 in 2015 to 10,882 in 2030 and 12,264 in 2050 (see Table 48).

Table 48: Projected evolution of vessel journeys and border crossings in the baseline scenario

	2015	2020	2030	2040	2050
Number of vessel journeys					
Freight	682,120	588,721	717,838	721,589	731,234
Passenger	8,867	827	12,043	12,940	13,572
Number of border crossings					
Freight	427,947	354,659	432,442	434,702	440,512
Passenger	8,344	747	10,882	11,693	12,264

Source: Elaboration of the contractor (2023)

⁷⁶ [Cruise Ship Passenger Capacity | CruiseMapper](#)

⁷⁷ From 799 tonnes per journey in 2015 and 859 tonnes per journey in 2020 to 961 tonnes per journey in 2030 and 1,111 tonnes per journey in 2050.

In terms of vessels-kilometres, the freight inland waterways activity is projected to remain relatively constant over time (from 184 million vessels-kilometres in 2015 to 185 million vessels-kilometres in 2030 and 191 million vessels-kilometres in 2050). This is despite the growing number of tonnes transported and can be explained by the increase in the number of tonnes per journey, as mentioned above⁷⁸. For passenger IWT, the activity is projected to increase from 3.1 million vessels-kilometres in 2015 to 4.2 million vessels-kilometres in 2030 and 4.8 million vessels-kilometres in 2050.

Evolution of the fleet

The number of cargo vessels has decreased significantly between 2003 and 2020⁷⁹. In 2003, there were 13,385 ships in the EU, but by 2020 their number has fallen to 10,332, a decline of 23%. The number of cargo vessels decreased because of scale enlargement (larger quantities per ship) and better functioning of the transport market (liberalisation). As the same time, the size of vessels is increasing, making up for the reduction in carrying capacity, which according to Eurostat decreases only by 3%. The overall downward trend in the number of cargo vessels is expected to reverse by 2030 (12,371 cargo vessels), driven by the increase in activity and the slower increase in the capacity of ships compared to the past, and it is expected to remain relatively stable until 2050 (12,223 cargo vessels) due to the increase in the productivity per vessel⁸⁰. On the other hand, the number of passenger vessels had increased from approximately 160 ships in 2004 to 405 ships in 2021. When the day-tour ships and smaller cycle holiday ships are counted, around 2,553 passenger ships were estimated to operate in the EU in 2015⁸¹. The number of passenger vessels is projected to follow the increase in the number of passengers (3,467 vessels projected in 2030 and 3,908 in 2050). It should however be noted that the majority of these vessels are small or very small. In contrast to cargo vessels, no further growth in scale or productivity is expected for passenger shipping.

Table 49: Projected evolution of the fleet in the baseline scenario

	2015	2020	2030	2040	2050
Freight	11,792	10,332	12,371	12,270	12,223
Passenger	2,553	2,942	3,467	3,726	3,908

⁷⁸ From 799 tonnes per journey in 2015 and 859 tonnes per journey in 2020 to 961 tonnes per journey in 2030 and 1,111 tonnes per journey in 2050.

⁷⁹ The year 2003 was chosen for the comparison because of data availability on the number of ships in both the Rhine, Danube and other river basins.

⁸⁰ This is assumed at 1.5% per year per ship/barge. This increase is justified by both technical and operational developments: for instance Smart And Autonomous Shipping which may result into a larger share of the fleet being able to sail 24/7 (in spite of labour shortages in the sector), increased attention to good navigational status of waterways (including 24/7 operation of bridges and locks on the major waterways) and scale enlargement in IWT of both companies (larger number of vessels per company) and vessels (larger load capacities for vessels), although at slower pace than in the past.

⁸¹ Prominent (2017)

	2015	2020	2030	2040	2050
Total fleet	14,345	13,274	15,838	15,996	16,131

Source: Elaboration of the contractor (2023)

Evolution of energy use, CO₂ and air pollutant emissions

The evolution of energy consumption and emissions draws on the PRIMES-TREMOVE model projections, while accounting for the share of inland waterways transport in inland waterways and domestic maritime activity. Energy use in freight IWT is projected to remain relatively stable by 2030 to its 2015 levels, despite the increase in activity, and to decrease to 895 ktoe⁸² by 2050 (11% decrease for 2015-2050), thanks to the uptake of more fuel-efficient technologies including electrification. For passenger vessels, energy consumption is projected to increase by 11% by 2030 (132 ktoe), driven by the strong growth in activity, and only to slightly decrease by 2050 relative to its 2015 levels (112 ktoe). Overall, considering both passenger and freight, energy use in inland waterways transport is projected to remain relatively stable by 2030 compared to its 2015 levels and to go down by 10% by 2050, relative to 2015.

In the baseline scenario, CO₂ emissions from inland waterways transport are projected to decrease much faster than the energy use (21% decrease for 2015-2030 and 67% decrease for 2015-2050). This is because of the large-scale uptake of renewable and low carbon fuels, namely e-fuels, biofuels and electricity. In this context, it should be noted that the baseline scenario assumes the implementation of the European Climate Law to which all sectors, including the inland waterways sector, need to contribute.

In terms of NO_x emissions a similar trend is expected. NO_x emissions are projected to reduce from 73 ktons in 2015 to just below 20 ktons in 2050. The amount of particulate matter emitted by inland navigation is also expected to reduce, from 3.8 ktons in 2015 to 1 kton in 2050. This is due to both electrification and the fact that the ships that continue to operate with internal combustion engines are becoming cleaner. In this context, it should be noted that since 2020 new combustion engines are considerably cleaner, thanks to the implementation of non-road mobile machinery (NRMM) Regulation⁸³ (NRMM Stage 5).

Table 50: Projected evolution of energy use, CO₂ and air pollutant emissions in the baseline

	2015	2020	2030	2040	2050
Energy use (ktoe)	1,124	828	1,129	1,060	1,007
Freight	1,006	818	997	938	895
Passenger	119	10	132	122	112
CO ₂ emissions (ktons)	3,476	2,416	2,745	2,182	1,084
Freight	3,109	2,387	2,424	1,930	963
Passenger	366	29	321	251	121

⁸² The tonne of oil equivalent (toe) is a unit of energy defined as the amount of energy released by burning one tonne of crude oil.

⁸³ Regulation (EU) 2016/1628.

	2015	2020	2030	2040	2050
NOx emissions (ktons)	73	49	47	32	18
Freight	65	49	41	28	16
Passenger	8	1	5	4	2
PM emissions (ktons PM2.5)	3.8	2.6	2.4	1.6	1.0
Freight	3.4	2.5	2.2	1.5	0.8
Passenger	0.4	0.0	0.3	0.2	0.1

Source: Elaboration of the contractor (2023) : PM stands for particulate matter emissions.

Evolution of the number of accidents

There is little consistent data on safety in the inland navigation sector, with available data coming from Eurostat and national databases for Bulgaria, Czechia, Germany, Croatia, Hungary, the Netherlands, Austria, Poland and Romania. In the baseline scenario, the projected evolution of the number of accidents is linked to the evolution of activity expressed in terms of vessel-kilometres. The number of accidents per vessel-kilometres is assumed to remain constant over time. Thus, the number of accidents is projected to slightly increase to 535 in 2030 and 551 in 2050 in the baseline scenario.

Table 51: Projected evolution of the number of accidents in the baseline scenario

	2015	2020	2030	2040	2050
Freight and passenger	529	433	535	539	551

Source: Elaboration of the contractor (2023)

5.2 Determining impacts

In this section we focus on the economic impacts of the measures.

PM1: Increase the harmonisation of RIS through guidelines

Under this measure, the European Commission, supported by CESNI (European Committee for drawing up standards in the field of inland navigation), would develop a set of guidelines that will support Member States and stakeholders in better interpreting and applying the existing technical standards⁸⁴. This would increase the level of harmonisation of RIS by removing different interpretations or incomplete application of the standards and will help to improve the quality of the information provided to the users through RIS and help the sector to identify required information more easily. This way for example the way water levels are communicated and predicted could also be improved. If guidelines would be developed for competent authorities, RIS information from different countries would become more comparable.

⁸⁴ These guidelines are not the same with the “RIS Guidelines” as mentioned in Annex II of the Directive, and which form an integral part of the standards, originating from the work of PIANC, and which are in force through Commission Regulation (EC) No 414/2007.

Adjustment costs for the European Commission

The development of the guidelines will proceed in two steps⁸⁵. A study will be carried out to compile the required elements and propose several options for the establishment of the standards. In a second stage, an expert group will use the findings of the study to draft the guidelines.

The one-off costs of the study are estimated at EUR 400,000. The average cost for a two-day workshop hosted by European Commission (EC), where participants are reimbursed by the EC, is around EUR 30,000. Two of such in-person workshops may be required as well as two online meetings. Compensation for the experts contributing to the online meetings is estimated at EUR 5,000 for each meeting. Therefore, the one-off adjustment costs for the European Commission are estimated at EUR 0.47 million.

Adjustment costs savings for navigation software service providers

The guidelines are expected to facilitate the work of navigation software service providers by reducing current inefficiencies, such as the ones caused by data inconsistencies between Member States. The improvement in the quality of the information provided through RIS under this measure is expected to lead to time savings for software service providers for introducing the data into their systems and thus to a reduction in their operation costs. In the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)⁸⁶. Considering the evolution of the fleet provided in section 2.2 of Annex 4, in the baseline scenario the total costs for navigation software service providers for introducing the data into their systems are estimated at EUR 6.9 million in 2025, EUR 7.2 million in 2030 and EUR 7.3 million in 2050. According to feedback provided by the RIS software service providers during the second stakeholder survey⁸⁷, PM1 would allow to reduce the average cost per vessel by 1% relative to the baseline (i.e. EUR 4.52 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are

⁸⁵ Note that CESNI is financed by the Commission through a grant agreement. Therefore, these funds would be transferred from the Commission to CESNI, which would be in charge of the actual development of the guidelines.

⁸⁶ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

⁸⁷ The feedback has been provided by the two navigation software service providers, based in Belgium, that serve around 90% of the market.

provided in Table 52. Expressed as present value over 2025-2050, they are estimated at EUR 1.25 million relative to the baseline (in 2022 prices)⁸⁸.

Table 52: Recurrent adjustment costs savings for navigation software service providers due to PM1 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	4.52	4.52	4.52
Adjustment costs savings for navigation software service providers (in EUR)	71,552	72,266	72,876

Source: Elaboration of the contractor (2023)

Adjustment costs savings for vessel operators

The guidelines are also expected to benefit vessel operators by facilitating their trip planning. When travelling across the management areas of several RIS authorities, it will be easier to compare and interpret the data. In the baseline scenario, the time required for preparing an international trip is estimated at 15 minutes, according to the survey undertaken in the context of this impact assessment. Based on discussions with training institutes in inland navigation (and validated by the sector in the targeted workshop), trip preparation time is expected to decrease by 2.5 minutes relative to the baseline from 2026 onwards thanks to PM1. The recurrent adjustment costs savings for vessel operators are derived based on the time saved for the preparation of a trip, the labour cost per hour (EUR 26.7 per hour⁸⁹) and the projected number of border crossings and are provided in Table 53. Expressed as present value over 2025-2050, they are estimated at EUR 8.61 million relative to the baseline (in 2022 prices).

Table 53: Recurrent adjustment costs savings for vessels operators due to PM1 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of border crossings per year	443,324	446,395	452,776
Adjustment costs savings for vessel operators (in EUR)	493,057	496,472	503,570

Source: Elaboration of the contractor (2023)

PM2: Introduce a harmonised complaint mechanism (in Member States)

Under this measure, Member States would need to designate a (existing or new) competent governmental body to directly handle complaints filed by RIS users. This body should be independent from RIS related authorities and would have the role to verify the complaints and request corrective action (e.g. correct wrong, outdated or

⁸⁸ Part of these costs savings benefiting software providers may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

⁸⁹ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

non-standardised data). This would improve the overall quality of data (by identifying for example mistakes in the databases) and point to areas and instances where RIS users believe that the Directive is not properly implemented. Each Member State will be responsible for addressing problems in their waterways, and a specific provision will be included that collaboration with neighbouring Member States should be undertaken if the complaint has a cross-border element. The functioning of this mechanism requires that each Member State will assign appropriate resources depending on the expected number of complaints.

Administrative costs for national public authorities

Recurrent administrative costs are expected due to PM2, related to staff for managing the complaints (e.g. sending them to the right person and coordinating the whole process). Based on the network usage (expressed in tonne-kilometres) and the size of the network (i.e. the number of entries in RIS index from EU-RIS portal is used as a proxy) in each Member State, and using as reference value the costs for the Netherlands (EUR 150,000) provided during a bilateral interview with Dutch Ministry of Infrastructure and Water Management (Rijkswaterstaat), the recurrent administrative costs to run the complaint mechanisms for all 13 European RIS-authorities are estimated at EUR 0.92 million per year from 2026 onwards relative to the baseline (in 2022 prices). Expressed as present value over 2025-2050, they are estimated at EUR 16.02 million relative to the baseline (in 2022 prices).

Table 54: Recurrent administrative costs for national public authorities due to PM2 relative to the baseline (in EUR, in 2022 prices)

	Usage (projected billion tkm in 2025)	Number of entries in RIS index from EU-RIS portal	Administrative costs (in EUR)
BE	11.5	18,279	63,624
BG	5.8	5,082	21,370
CZ	0.0	4,704	12,135
DE	63.2	65,760	260,217
FR	7.9	120,623	321,363
HR	1.0	5,634	15,969
LU	0.3	412	1,437
HU	2.3	4,531	14,958
NL	51.9	29,184	150,000
AT	2.2	4,705	15,215
PL*	0.1	2,235	5,896
RO	17.3	2,414	31,126
SK	1.0	2,056	6,672
Total	164	265,619	919,984

Source: Elaboration of the contractor (2023); ; Note: * estimated RIS index.

Adjustment costs for national public authorities

In addition, introducing a complaints procedure would involve one-off investment costs to set the system. Based on the experience of EMSA when setting up the e-certificate registry⁹⁰, these costs are estimated to be three times the recurrent annual costs for running the complaint mechanism or EUR 2.76 million in 2025.

Adjustment cost savings for navigation software service providers

The introduction of a complaints mechanism per country will facilitate the communication between navigation software service providers and authorities and lead to time savings for navigation software service providers. For instance, navigation software service providers often struggle to find the appropriate contact within RIS authorities, preventing an efficient exchange of information when they identify incorrect data. The complaints procedure will lead to easier contacts with authorities, enabling a faster (bottom up) handling of technical issues in the provision of RIS services and compliance with standards. As explained under PM1, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)⁹¹. According to feedback provided by the RIS software service providers during the second stakeholder survey⁹², PM2 would allow to reduce the average cost per vessel by 0.5% relative to the baseline (i.e. EUR 2.26 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 55. Expressed as present value over 2025-2050, they are estimated at EUR 0.63 million relative to the baseline (in 2022 prices)⁹³.

Table 55: Recurrent adjustment costs savings for navigation software service providers due to PM2 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	2.26	2.26	2.26
Adjustment costs savings for navigation software service providers (in EUR)	35,776	36,133	36,438

⁹⁰ European Maritime Safety Agency (EMSA). European Union. Available at: https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/institutions-and-bodies-profiles/emsa_en

⁹¹ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

⁹² The feedback has been provided by the two navigation software service providers, based in Belgium, that serve around 90% of the market.

⁹³ Part of these costs savings benefiting software provides may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

Source: Elaboration of the contractor (2023)

Adjustment cost savings for vessel operators

In addition, the filing of complaints by vessel operators is expected to lead to improvements in RIS data. In the baseline scenario the time required for preparing an international trip is estimated at 15 minutes and that for a domestic trip at 10 minutes, according to the survey undertaken in the context of this impact assessment. Based on discussions with training institutes in inland navigation (and validated by the sector in the targeted workshop), trip preparation time is expected to decrease by 8% due to PM2 (1.2 minutes for international trips and 0.8 minutes for domestic trips) relative to the baseline from 2026 onwards. The recurrent adjustment costs savings for vessel operators are derived based on the time saved for the preparation of a trip, the labour cost per hour (EUR 26.7 per hour⁹⁴) and the projected number of domestic trips and border crossings, and are provided in Table 56. Expressed as present value over 2025-2050, they are estimated at EUR 6.16 million relative to the baseline (in 2022 prices).

Table 56: Recurrent adjustment costs savings for vessels operators due to PM2 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of domestic trips per year	286,557	288,134	292,030
Number of border crossings per year	443,324	446,395	452,776
Adjustment costs savings for vessel operators (in EUR)	352,763	355,056	360,048

Source: Elaboration of the contractor (2023)

Administrative cost savings for vessel operators

Vessel operators that may lodge a complaint would benefit of administrative costs savings relative to the baseline due to the use of a structured mechanism. However, these costs savings are expected to be limited and are not further estimated.

PM3: Introduce a new Performance Measurement Framework

This measure aims to improve the monitoring of the implementation of the RIS Directive, by requiring Members States and relevant authorities to report to the Commission, on a regular basis, on key performance indicators (e.g. the number of shipping messages issued in accordance with standards and interpretations from the most recent RIS encoding guide, and the number of electronic cargo reports received in relation to the number of voyages). This should partly address the issue of lack of available data identified by the evaluation. The key performance indicators will be developed by the European Commission with the assistance of CESNI. Member States will have to undertake the collection of the required data. Having better information, the European Commission will be able to follow more closely the

⁹⁴ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

provision of RIS and identify cases where RIS implementation is fragmented. Based on this it will be requesting the responsible Member State to undertake corrective action. As a result, RIS users are expected benefit from improved harmonised RIS services.

Adjustment costs for the European Commission

Setting up the structure of the new performance measurement framework will be done in the context of the existing working groups, for example CESNI and PIANC. They will identify the data necessary for the new framework and set up the terms of reference. This task can be considered within the mandate of those working groups and, therefore will not lead to additional costs relative to the baseline.

Administrative costs for national public authorities

National public authorities will face recurrent administrative costs to collect and process the data and report it to the Commission on an annual basis. Based on two interviews with national authorities, it is estimated that each of the 13 Member States using inland waterways for commercial purposes would spend EUR 50,000 per year. Thus, total administrative costs for national public authorities are estimated at EUR 650,000 per year from 2025 onwards. Expressed as present value over 2025-2050, they are estimated at EUR 11.97 million relative to the baseline.

Adjustment cost savings for navigation software service providers

The new Performance Measurement Framework will allow to monitor the implementation of the Directive and, ultimately, collect more accurate information. As explained above, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)⁹⁵. According to feedback provided by the RIS software service providers during the second stakeholder survey⁹⁶, PM3 would allow to reduce the average cost per vessel by 0.25% relative to the baseline (i.e. EUR 1.13 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 57. Expressed as present value over 2025-2050, they are estimated at EUR 0.31 million relative to the baseline (in 2022 prices)⁹⁷.

⁹⁵ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

⁹⁶ The feedback has been provided by the two navigation software service providers, based in Belgium, that serve around 90% of the market.

⁹⁷ Part of these costs savings benefiting software provides may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

Table 57: Recurrent adjustment costs savings for navigation software service providers due to PM3 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	1.13	1.13	1.13
Adjustment costs savings for navigation software service providers (in EUR)	17,888	18,066	18,219

Source: Elaboration of the contractor (2023)

Adjustment cost savings for vessel operators

The new Performance Measurement Framework will allow to monitor the implementation of the Directive and, ultimately, collect more accurate information. Consequently, vessel operators will save resources when preparing their journeys. As explained above, in the baseline scenario, the time required for preparing an international trip is estimated at 15 minutes and that for a domestic trip at 10 minutes, according to the survey undertaken in the context of this impact assessment. The vessel operators that responded to the survey estimated that the time spent on planning trips will decrease by 4% on average due to PM3 relative to the baseline (approximately 0.6 minutes for each international trip and 0.4 minutes for each domestic trip) from 2026 onwards. The recurrent adjustment costs savings for vessel operators are derived based on the time saved for the preparation of a trip, the labour cost per hour (EUR 26.7 per hour⁹⁸) and the projected number of domestic trips and border crossings, and are provided in Table 58. Expressed as present value over 2025-2050, they are estimated at EUR 3.08 million relative to the baseline (in 2022 prices).

Table 58: Recurrent adjustment costs savings for vessels operators due to PM3 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of domestic trips per year	286,557	288,134	292,030
Number of border crossings per year	443,324	446,395	452,776
Adjustment costs savings for vessel operators (in EUR)	176,381	177,528	180,024

Source: Elaboration of the contractor (2023)

PM4: Strengthen requirements for RIS standards by adding new standards on data for navigation and voyage planning (RIS Index)

This measure aims to strengthen the requirements of Annex I of the current RIS Directive by introducing new technical specifications ('standards') on data for navigation and voyage planning ('RIS Index'), and strengthen provisions under Article 4, paragraph 3, for the supply of such data by the Member States. This will improve the quality of the basic data provided in RIS and will benefit in particular

⁹⁸ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

skippers who will have better and up-to-date information, reducing the time needed to plan their voyage. This measure also introduces new additional requirements into the RIS Directive that require Member States to ensure that information relating to the efficiency of navigation (e.g. current and expected waiting times at bridges and locks) is shared. This information will assist vessel operators during navigation. Member States will need to undertake digital hardware and software updates in order to provide the required information. The detailed standards that will be required will be adopted at a later stage, as with the rest of the technical standards, through an implementing act. This measure will also facilitate the adoption of ‘smart shipping’⁹⁹ systems for the automation of navigation.

Adjustment costs for national public authorities

To enable more efficient navigation a series of data including for instance clearance heights at bridges, information on fairway profiles and digitisation of vessel traffic signs will have to be collected. Moreover, the system should also include information on the real-time traffic situation, such as current and expected waiting times at locks. Obtaining and sharing these data requires investment in both digital hardware and software (to monitor and report on the information mentioned above). Based on interviews with Rijkswaterstaat this measure is estimated to lead to one-off adjustment costs of EUR 500,000 in the Netherlands alone. Considering each country’s share of the network in terms of length and infrastructure elements such as locks and bridges (i.e. using as proxy the number of entries in RIS index from EU-RIS portal), these costs have been extrapolated for the other twelve Member States. For the 13 Member States, total one-off adjustment costs are estimated at EUR 4.55 million. The breakdown by Member State is provided in Table 59.

Table 59: One-off adjustment costs for national public authorities due to PM4 relative to the baseline (in EUR, in 2022 prices)

	Number of entries in RIS index from EU-RIS portal	One-off adjustment costs (in EUR)
BE	18,279	313,168
BG	5,082	87,068
CZ	4,704	80,592
DE	65,760	1,126,645
FR	120,623	2,066,595
HR	5,634	96,525
LU	412	7,059
HU	4,531	77,628
NL	29,184	500,000
AT	4,705	80,609
PL*	2,235	38,292
RO	2,414	41,358
SK	2,056	35,225

⁹⁹ ‘Smart shipping’ is a general term referring to different technologies to facilitate navigation. CCNR has classify them in five levels: Level 1.Steering assistance, Level 2.Partial automation (steering and propulsion, designed to reduce fuel consumption), Level 3.Conditional automation (including collision avoidance), Level 4.High automation (context-specific automation of all dynamic navigation tasks), Level 5.Full automation (unconditional automation of all dynamic navigation tasks). In addition, Level 0 refers to no automation even when warning and intervention systems such as radars assist the helmsman.

	Number of entries in RIS index from EU-RIS portal	One-off adjustment costs (in EUR)
Total	265,619	4,550,764

Source: Elaboration of the contractor (2023) ; ; Note: * estimated RIS index.

Administrative costs for national public authorities

Both the hardware and software used for the exchange of the collected data will need to be updated and maintained on a regular basis. The annual maintenance costs are assumed to be 25% of the investment costs, based on the DINA study¹⁰⁰. Thus, the recurrent administrative costs for national public authorities are estimated at EUR 1.14 million per year from 2026 onwards. The breakdown by Member State is provided in Table 60. Expressed as present value over 2025-2050, they are estimated at EUR 19.81 million relative to the baseline (in 2022 prices).

Table 60: Recurrent administrative costs for national public authorities due to PM4 relative to the baseline (in EUR, in 2022 prices)

	Administrative costs (in EUR)
BE	78,292
BG	21,767
CZ	20,148
DE	281,661
FR	516,649
HR	24,131
LU	1,765
HU	19,407
NL	125,000
AT	20,152
PL	9,573
RO	10,340
SK	8,806
Total	1,137,691

Source: Elaboration of the contractor (2023)

Adjustment cost savings for navigation software service providers

Navigation software service providers are currently building their own smart software to offer added value to their customers. For instance, including more data via AIS stations at bridges on waterways with variable water levels (free flowing rivers) can improve the service. As explained above, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)¹⁰¹. Based on

¹⁰⁰ European Commission (2017): *Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report*. According to the study, the maintenance of digital tools e.g. as a result of service level agreements and license fees, represents approximately 20% of the initial technology investment. Another 5% is attributed to the governance of the required standards and the coordination of the implementation.

¹⁰¹ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

feedback from software services providers in the context of stakeholders' consultation, PM4 would allow to reduce the average cost per vessel by 2% relative to the baseline (i.e. EUR 9.04 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 61. Expressed as present value over 2025-2050, they are estimated at EUR 2.5 million relative to the baseline (in 2022 prices)¹⁰².

Table 61: Recurrent adjustment costs savings for navigation software service providers due to PM4 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	9.04	9.04	9.04
Adjustment costs savings for navigation software service providers (in EUR)	143,104	144,532	145,751

Source: Elaboration of the contractor (2023)

Adjustment cost savings for vessel operators

PM4 would make new data available for vessel operators including longer and more accurate water level predictions, current and predicted underpass heights at bridges and current and predicted waiting times at locks. Based on feedback from vessel operators in the context of the stakeholders' consultation, the time needed for voyage planning can be reduced by 15% due to PM4 relative to the baseline. This corresponds to 1.5 minutes saved for each domestic voyage and 2.25 minutes saved for each international trip from 2026 onwards. The recurrent adjustment costs savings for vessel operators are derived based on the time saved for the preparation of a trip, the labour cost per hour (EUR 26.7 per hour¹⁰³) and the projected number of domestic voyages and border crossings, and are provided in Table 62. Expressed as present value over 2025-2050, they are estimated at EUR 11.09 million relative to the baseline (in 2022 prices).

Table 62: Recurrent adjustment costs savings for vessels operators due to PM4 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of domestic voyages	286,557	288,134	292,030
Number of border crossings per year	443,324	446,395	452,776
Adjustment costs savings for vessel operators (in EUR)	634,973	639,100	648,087

Source: Elaboration of the contractor (2023)

¹⁰² Part of these costs savings benefiting software providers may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

¹⁰³ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

PM5: Require electronic voyage plan reporting

While PM4 deals with information provided by the Member States to vessel operators, PM5 focuses on requiring vessel operators and skippers to report their voyage plan (ERIVoy) to competent authorities at the start of their journey and update this with any further changes to their estimated time of arrival. This would allow authorities to provide (more accurate) feedback on estimated waiting times at locks and advised navigation speeds. Optimising vessel speed would lead to fuel savings and thus lower emissions and operation costs. In addition, inland ports and traffic managers at locks and bridges can better channel traffic, reducing delays and increasing efficiency.

Adjustment costs for national public authorities

The standards for ERIVoy messages have already been implemented by the software service providers. National public authorities would need to develop a software that can process and convert the voyage plan notification message (ERIVoy) from inland waterway operators into accurate lock predictions. The Dutch Directorate General for Public Works and Water Management (Rijkswaterstaat) estimated the one-off investment costs for the development of such software at EUR 500,000. Based on the network usage (expressed in tonne-kilometres) and the size of the network (i.e. the number of entries in RIS index from EU-RIS portal is used as a proxy) in each Member State, and using as reference value the investment costs for the Netherlands (EUR 500,000), the one-off adjustment costs for all 13 European RIS-authorities are estimated at EUR 3.07 million in 2025 relative to the baseline (in 2022 prices).

Table 63: One-off adjustment costs for national public authorities due to PM5 relative to the baseline (in EUR, in 2022 prices)

	Usage (projected billion tkm in 2025)	Number of entries in RIS index from EU-RIS portal	One-off adjustment costs (in EUR)
BE	11.5	18,279	212,080
BG	5.8	5,082	71,235
CZ	0.0	4,704	40,449
DE	63.2	65,760	867,391
FR	7.9	120,623	1,071,211
HR	1.0	5,634	53,230
LU	0.3	412	4,791
HU	2.3	4,531	49,860
NL	51.9	29,184	500,000
AT	2.2	4,705	50,717
PL*	0.1	2,235	19,655
RO	17.3	2,414	103,755
SK	1.0	2,056	22,239
Total	164	265,619	3,066,613

Source: Elaboration of the contractor (2023) ; Note: * estimated RIS index.

Administrative costs for national public authorities

The implementation of a new software implies maintenance costs for software and hardware. The annual maintenance costs are assumed to be 25% of the investment costs, based on the DINA study¹⁰⁴. Thus, the recurrent administrative costs for national public authorities are estimated at EUR 0.77 million per year from 2026 onwards. The breakdown by Member State is provided in Table 64. Expressed as present value over 2025-2050, they are estimated at EUR 13.35 million relative to the baseline (in 2022 prices).

Table 64: Recurrent administrative costs for national public authorities due to PM5 relative to the baseline (in EUR, in 2022 prices)

	Administrative costs (in EUR)
BE	53,020
BG	17,809
CZ	10,112
DE	216,848
FR	267,803
HR	13,308
LU	1,198
HU	12,465
NL	125,000
AT	12,679
PL	4,914
RO	25,939
SK	5,560
Total	766,653

Source: Elaboration of the contractor (2023)

Administrative costs for vessel operators

The mandatory voyage plan reporting for inland navigation would lead to recurrent administrative costs for vessel operators. The analysis assumes that the ERIVoy messages would be added to the ERINOT messages¹⁰⁵.

Based on replies by inland skippers in the context of stakeholders' consultation, preparing and communicating a voyage plan will take 34 minutes for the first notification and 14 minutes for follow-up notifications. For freight IWT, the number of first notifications per year is equal to the projected number of voyages. For deriving the number of follow-up notifications, it is assumed that barges are deployed an

¹⁰⁴ European Commission (2017): *Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report*. According to the study, the maintenance of digital tools e.g. as a result of service level agreements and license fees, represents approximately 20% of the initial technology investment. Another 5% is attributed to the governance of the required standards and the coordination of the implementation.

¹⁰⁵ The electronic cargo report (ERINOT) report contains information on origin and destination of the voyage, the amount and type of cargo and the number of persons on board. This can optionally include an ETA at destination. An ERIVoy message is much more comprehensive.

average of 5.5 days per week and the average voyage duration is 5 days. Hence, each voyage includes one loading day, three sailing days and one unloading day. This means that each voyage entails one initial notification and two follow-up notifications. For passenger IWT, similarly to freight, the number of first notifications per year is equal to the projected number of voyages. For calculating the number of follow-up notifications for passenger IWT, 214 sailing days per year have been assumed (April-October period). The number of initial and follow-up notifications for freight and passenger IWT is provided in Table 65. The total recurrent administrative costs for vessel operators have been derived considering the labour cost per hour (EUR 26.7 per hour¹⁰⁶), the number of initial and follow-up notifications and the time for preparing the first and follow-up notifications and are provided in Table 65. Expressed as present value over 2025-2050, they are estimated at EUR 367.5 million (EUR 86.26 million for passenger IWT and EUR 281.25 million for freight IWT).

Table 65: Recurrent administrative costs for vessels operators due to PM5 relative to the baseline (in EUR, in 2022 prices)

	2025	2030	2040	2050
Number of first notifications	718,186	729,880	734,529	744,806
Passenger	11,567	12,043	12,940	13,572
Freight	706,619	717,838	721,589	731,234
Number of follow-up notifications	1,377,507	1,416,312	1,472,098	1,518,409
Passenger	670,888	698,475	750,508	787,175
Freight	706,619	717,838	721,589	731,234
Recurrent administrative costs (in million EUR)	19.3	19.7	20.2	20.6
Passenger	4.3	4.5	4.8	5.1
Freight	15.0	15.3	15.3	15.5

Source: Elaboration of the contractor (2023)

Adjustment costs savings for vessel operators

Operation costs savings for vessel operators are expected due to PM5 through reduced speed of ships and less manoeuvring movements (e.g. braking the ship, mooring at waiting jetties, leaving and entering the lock). These savings are mainly related to the crossing of locks and adaptation of the speed in the proximity of a lock (i.e. the last hour). The adjustment of speed in the proximity of a lock (i.e. during the last hour) is estimated to lead to 5% savings in fuel consumption relative to the baseline from 2026 onwards. Based on statistics for the Netherlands, vessel cross on average 4 locks per trip. Also considering the total number of voyages and a consumption of 60 litres per hour of sailing, savings are estimated at around 0.89% of total energy consumption. The energy savings in ktoe and the recurrent adjustment costs savings (fuel savings) relative to the baseline for 2030, 2040 and

¹⁰⁶ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

2050 are provided in Table 66¹⁰⁷. Expressed as present value over 2025-2050 they are estimated at EUR 248.72 million.

Table 66: Recurrent adjustment costs savings for vessels operators due to PM5 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Energy savings (ktoe)	9.3	8.8	8.3
Adjustment costs savings (million EUR)	15.0	14.4	15.2

Source: Elaboration of the contractor (2023)

PM6: Introduce provisions for supplying data to the ERDMS and its operation

Under this measure, Member States would need to provide all information required by the RIS Directive to the European Reference Data Management System (ERDMS), which contains regularly updated data necessary for the provision of RIS and is owned and operated by the European Commission (DG MOVE). Integration of the RIS-data in ERDMS with RIS COMEX is foreseen, and data should be aligned. This measure mostly affects RIS users and navigation software service providers and would make it easier for navigation software service providers to collect the right data and pass it on to the industry. Member States will have to undertake efforts to ensure that the required information is provided and up to date.

Administrative costs for national public authorities

No additional investment costs are expected due to PM6 relative to the baseline. Member States already have access to a reference database containing all RIS objects. However, the level of accuracy of this data varies across Member States.

At present, there are no obligations regarding reference data. Some RIS authorities still provide outdated or even incorrect data about objects on the European waterways network. PM6 would require Member States to periodically update their data. Thus, PM6 is expected to lead to recurrent administrative costs for national public authorities relative to the baseline. Based on the feedback received during the stakeholders' consultation, for the Netherlands PM6 is estimated to require additional 1.5 full time equivalents (FTE) relative to the baseline. This has been extrapolated to the other Member States based on the size of their network (i.e. the number of entries in RIS index from EU-RIS portal is used as a proxy) in relation to that of the Netherlands. Assuming 240 working days per year and 7.3 hours of work per day on average¹⁰⁸, and using the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) from Eurostat Structure of earnings survey, the recurrent administrative costs for national public authorities are estimated at EUR 0.66 million per year relative to the baseline from 2025 onwards.

¹⁰⁷ The projected average energy costs per toe from the baseline scenario developed with the PRIMES-TREMOVE model have been used to estimate the adjustment costs savings. These average costs per toe consider the projected development of the fuel mix, including biofuels, electricity and e-fuels.

¹⁰⁸ [Hours of work - annual statistics - Statistics Explained \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&code=sdg_8_4_1&plugin=1)

Expressed as present value over 2025-2050, they are estimated at EUR 12.18 million.

Table 67: Recurrent administrative costs for national public authorities due to PM6 relative to the baseline (in EUR, in 2022 prices)

	Number of entries in RIS index from EU- RIS portal	Additional number of FTEs	Administrative costs (in EUR)
BE	18,279	0.94	51,390
BG	5,082	0.26	2,123
CZ	4,704	0.24	5,326
DE	65,760	3.38	175,907
FR	120,623	6.20	318,739
HR	5,634	0.29	4,537
LU	412	0.02	1,013
HU	4,531	0.23	3,578
NL	29,184	1.50	80,758
AT	4,705	0.24	12,505
PL*	2,235	0.11	1,859
RO	2,414	0.12	1,574
SK	2,056	0.11	2,198
Total	265,619		661,507

Source: Elaboration of the contractor (2023) ; Note: * estimated RIS index.

Adjustment cost savings for navigation software service providers

Software service providers carry out quality checks on the data and correct erroneous data, if necessary, when receiving complaints. Obliging RIS authorities to periodically update the data, the number of errors is expected to decrease. This would also reduce the efforts required for navigation software service providers to obtain correct data. As explained above, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)¹⁰⁹. Based on feedback from software services providers in the context of stakeholders' consultation, PM6 would allow to reduce the average cost per vessel by 2% relative to the baseline (i.e. EUR 9.04 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in

¹⁰⁹ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

Table 68. Expressed as present value over 2025-2050, they are estimated at EUR 2.5 million relative to the baseline (in 2022 prices)¹¹⁰.

Table 68: Recurrent adjustment costs savings for navigation software service providers due to PM6 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	9.04	9.04	9.04
Adjustment costs savings for navigation software service providers (in EUR)	143,104	144,532	145,751

Source: Elaboration of the contractor (2023)

Adjustment cost savings for vessel operators

Based on feedback from vessel operators in the context of the stakeholders' consultation, the time needed for voyage planning can be reduced by 20% due to PM6 relative to the baseline. This corresponds to 2 minutes saved for each domestic voyage and 3 minutes saved for each international trip from 2026 onwards. The recurrent adjustment costs savings for vessel operators are derived based on the time saved for the preparation of a trip, the labour cost per hour (EUR 26.7 per hour¹¹¹) and the projected number of domestic trips and border crossings, and are provided in Table 69. Expressed as present value over 2025-2050, they are estimated at EUR 14.79 million relative to the baseline (in 2022 prices).

Table 69: Recurrent adjustment costs savings for vessels operators due to PM6 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of domestic voyages	286,557	288,134	292,030
Number of border crossings per year	443,324	446,395	452,776
Adjustment costs savings for vessel operators (in EUR)	846,631	852,133	864,116

Source: Elaboration of the contractor (2023)

PM7: Encourage cargo-related information exchange through the eFTI mechanism

This measure will require that standards are developed so that RIS cargo related information (i.e. electronic ship reports as specified in Commission Implementing Regulation 2019/1744) can be shared on a voluntary basis through the electronic freight transport information (eFTI) platforms. This includes both authority to ship

¹¹⁰ Part of these costs savings benefiting software providers may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

¹¹¹ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

and authority to authority information. The standards will be developed but not made obligatory for use. The mandatory reporting requirements for specific ships would still apply (i.e. ships transporting dangerous goods). The Member States will need to develop the capacity to receive and process information through eFTI.

Adjustment costs for national public authorities

PM7 will require national public authorities to adapt existing data flows so that RIS cargo-related information is linked with eFTI. There are currently five systems in place: BICS (Netherlands), eRIBa (Belgium), VELI (France), NAMIB (Germany), and CEERIS (Rest of Europe). Based on feedback from RIS authorities, the investment costs for adjusting each of these systems are estimated at EUR 250,000 per system. Thus, the total one-off adjustment costs are estimated at EUR 1.25 million in 2025 relative to the baseline.

Administrative cost savings for vessel operators

PM7 would lead to recurrent administrative costs savings for inland shipping skippers. Interviews with waterway managers during the stakeholders' consultation have revealed that incorrect reference information, such as regarding the loading/unloading location, coding of the cargo or hull information, is the cause of errors in data exchange. These errors force the skippers to re-register upon a border crossing. Repeated notifications are estimated to occur in 20% of international trips in the Rhine catchment area and in all international trips (100%) in the Danube catchment area. Considering the number of trips in both catchment areas, it is estimated that 30% of all cross-border trips require repeated notifications. Based on the interviews and stakeholders' survey, repeated notifications take around 15 minutes per vessel operator. PM7 is expected to reduce the share of repeated notifications by 10 percentage points relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7 per hour¹¹²), the administrative cost savings for vessels operators due to PM7 relative to the baseline are provided in Table 70. Expressed as present value over 2025-2050, they are estimated at EUR 5.01 million relative to the baseline.

Table 70: Recurrent administrative costs savings for vessels operators due to PM7 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of border crossings requiring repeated notifications in the baseline	132,997	133,918	135,833
Reduction in the number of repeated notifications due to PM7 relative to the baseline	44,332	44,639	45,278

¹¹² Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

Administrative costs savings for vessel operators due to PM7 (in EUR)	286,792	288,778	292,912
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Source: Elaboration of the contractor (2023)

Administrative cost savings for national public authorities

The information exchange through the eFTI mechanism leads to the replacement of the paper cargo reports with the electronic reports. The number of paper cargo reports is assumed to grow in line with the transport activity in the baseline scenario. According to the estimates provided by the Dutch authorities during the interviews, a total elimination of the paper reports would lead to a reduction in the effort required equivalent to 8 full time equivalents (FTE) relative to the baseline. Considering the voluntary system in PM7, a 50% reduction in the paper cargo reports is assumed, equivalent to 4 FTEs saved relative to the baseline in 2026. This is extrapolated to the other Member States based on their respective transport activity (expressed in tkm) relative to that of the Netherlands. In addition, the growth in the number of paper cargo reports over time is also considered. Assuming 240 working days per year and 7.3 hours of work per day on average¹¹³, and using the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) from Eurostat Structure of earnings survey, the recurrent administrative costs savings for national public authorities are provided in Table 71. Expressed as present value over 2025-2050, they are estimated at EUR 11.45 million relative to the baseline.

Table 71: Recurrent administrative costs savings for national public authorities due to PM7 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
BE	51,247	56,765	60,735
BG	3,926	4,522	4,933
CZ	60	72	82
DE	277,928	305,078	338,957
FR	32,572	33,811	34,329
HR	1,341	1,590	1,751
LU	997	1,214	1,315
HU	2,965	3,655	3,988
NL	222,516	238,676	254,861
AT	9,523	10,068	10,229
PL	183	261	293
RO	18,712	20,591	22,821
SK	1,596	1,716	1,825
Total	623,566	678,018	736,120

Source: Elaboration of the contractor (2023)

PM8: Mandate cargo-related information to be exchange through the eFTI mechanism

This measure goes beyond PM7 in that it will mandate that all RIS cargo related information (i.e. electronic ship reports as specified in Commission Implementing

¹¹³ [Hours of work - annual statistics - Statistics Explained \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&code=sdg_8_4_1&plugin=1)

Regulation 2019/1744) are shared through the electronic freight transport information (eFTI) platforms, for exchanges between authority / authority and authority / ship. This should lead to higher benefits than PM7 as more vessel operators will report cargo information in this way.

Adjustment costs for national public authorities

PM8 will require national public authorities to adapt existing data flows so that RIS cargo-related information is linked with eFTI. There are currently five systems in place: BICS (Netherlands), eRIBa (Belgium), VELI (France), NAMIB (Germany), and CEERIS (Rest of Europe). Based on feedback from RIS authorities, the investment costs for adjusting each of these systems are estimated at EUR 250,000 per system. Thus, the total one-off adjustment costs are estimated at EUR 1.25 million in 2025 relative to the baseline.

Administrative cost savings for vessel operators

Similarly, to PM7, PM8 would lead to recurrent administrative costs savings for inland shipping skippers. Interviews with waterway managers during the stakeholders' consultation have revealed that incorrect reference information, such as regarding the loading/unloading location, coding of the cargo or hull information, is the cause of errors in data exchange. These errors force the skippers to re-register upon a border crossing. Repeated notifications are estimated to occur in 20% of international trips in the Rhine catchment area and in all international trips (100%) in the Danube catchment area. Considering the number of trips in both catchment areas, it is estimated that 30% of all cross-border trips require repeated notifications. Based on the interviews and stakeholders' survey, repeated notifications take around 15 minutes per vessel operator. PM8 is expected to reduce the share of repeated notifications by 20 percentage points relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7 per hour¹¹⁴), the administrative cost savings for vessels operators due to PM8 relative to the baseline are provided in Table 72. Expressed as present value over 2025-2050, they are estimated at EUR 10.01 million relative to the baseline.

Table 72: Recurrent administrative costs savings for vessels operators due to PM8 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of border crossings requiring repeated notifications in the baseline	132,997	133,918	135,833
Reduction in the number of repeated notifications due to PM8 relative to the baseline	88,617	89,230	90,506

¹¹⁴ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

	2030	2040	2050
Administrative costs savings for vessel operators due to PM8 (in EUR)	573,281	577,246	585,501

Source: Elaboration of the contractor (2023)

For the purpose of the application of the 'one in, one out' approach, the average reduction in the number of repeated notifications over 2026-2035 has been estimated at 88,397 per year relative to the baseline and the average costs saved per repeated notification at EUR 6.5. Thus, the average annual administrative costs savings for vessel operators are estimated at EUR 0.57 million relative to the baseline.

Administrative cost savings for national public authorities

As explained for PM7, the introduction of the exchange of information will reduce the need to handle paper cargo reports. Making it compulsory will fully eliminate the paper reports. According to the estimates provided by the Dutch authorities during the interviews, a total elimination of the paper reports would lead to a reduction in the effort equivalent to 8 full time equivalents (FTE) relative to the baseline in 2026. This is extrapolated to the other Member States based on their respective transport activity (expressed in tkm) relative to that of the Netherlands. In addition, the growth in the number of paper cargo reports over time is also considered. Assuming 240 working days per year and 7.3 hours of work per day on average¹¹⁵, and using the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) from Eurostat Structure of earnings survey, the recurrent administrative costs savings for national public authorities are provided in Table 73. Expressed as present value over 2025-2050, they are estimated at EUR 22.89 million relative to the baseline.

Table 73: Recurrent administrative costs savings for national public authorities due to PM8 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
BE	102,495	113,529	121,470
BG	7,852	9,043	9,866
CZ	121	144	165
DE	555,856	610,155	677,913
FR	65,143	67,622	68,658
HR	2,683	3,181	3,503
LU	1,994	2,428	2,630
HU	5,929	7,309	7,976
NL	445,031	477,352	509,722
AT	19,046	20,137	20,458
PL	366	522	587
RO	37,424	41,182	45,643
SK	3,192	3,431	3,650
Total	1,247,133	1,356,036	1,472,240

Source: Elaboration of the contractor (2023)

¹¹⁵ [Hours of work - annual statistics - Statistics Explained \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&code=sdg_8_4_1)

PM9: Require information exchange through the RIS COMEX platform

This measure would require Member States to exchange information through the RIS COMEX platform. RIS COMEX was a CEF funded multi-beneficiary project aiming at the definition, specification, implementation and sustainable operation of Corridor RIS Services. Following the project conclusion in 2022, the 13 participating Member States¹¹⁶ of the connected European Inland Waterway Network and their authorities continue the use of the system under a separate European Corridor Management Agreement¹¹⁷. The result of the RIS COMEX project is thus currently used on a voluntary basis by the Member States that apply RIS, as a one stop shop of exchange of data. For example, through the EuRIS - European River Information Services platform (www.eurisportal.eu) waterway users can consult all relevant fairway-related information of all waterways in Europe in one place and plan their travel and arrival times across Europe in one environment, without the need to consult numerous websites and information sources (especially when crossing borders). The project is entering a second phase (RIS COMEX 2) as in June 2023 it was selected for CEF funding with Poland joining as a partner. This indicates the interest of the Member States to continue with this platform as a basis for RIS. RIS COMEX 2 shall continue the work of the first stage (RIS COMEX) by extending the quantity and quality of the related services and provided data, by extending the geographical scope to additional waterways and even to additional countries (Poland), as well as by focusing on interconnections and integrations of existing systems and services.

PM9 will mandate the use of RIS COMEX¹¹⁸, ensuring that a common structure is in place - one where all additional functionalities will be built upon. In this respect, PM9 will be the basic element for implementing the exchange of RIS information and works in combination with other measures of this initiative (e.g. PM4, PM6, PM8, PM12, PM14). By mandating the use of RIS COMEX, efficient use of EU funds is ensured, as the development was already supported under CEF, and duplication of efforts (e.g. by developing another system) is avoided.

Adjustment costs for national public authorities

One-off investment costs for national public authorities are expected due to PM9. They cover those countries that were not part of the initial RIS COMEX project (e.g. Italy, Spain, Portugal) and who will need to develop the necessary digital applications. They also cover elements in RIS COMEX that will need to be updated/completed (for example, the inland waters of a maritime character in

¹¹⁶ The current partnership consists of the following countries: Austria, Belgium, Bulgaria, Croatia, Czechia, France, Germany, Hungary, Luxembourg, the Netherlands, Romania, Serbia and Slovakia.

¹¹⁷ The agreement defines the governance structure, financing, sharing of costs, and other elements such as the "Partnership Coordinator" who manages the platform.

¹¹⁸ While RIS COMEX has resulted in different applications, this measure uses the term RIS COMEX to refer to the overall results of the project as applied by the EU Member States.

Germany are missing). The one-off adjustment costs for national public authorities are estimated at EUR 3.5 million in 2025 relative to the baseline.

Administrative costs savings for national public authorities

The ultimate aim of PM9 is to replace the national platforms that currently coexist. This can only happen if the functionality of RIS COMEX is equivalent to that of the national platforms and can also serve a broader purpose, such as providing information on waterways exclusively navigable for recreational navigation. When this is achieved, it is expected that the existing national platforms would be phased out. PM9 would thus lead to recurrent administrative costs savings estimated at EUR 500,000 per year from 2030 onwards. Expressed as present value over 2025-2050, they are estimated at EUR 7.71 million relative to the baseline.

Adjustment cost savings for navigation software service providers

Using RIS COMEX as a central platform will benefit navigation software providers, as they can obtain information from a central place, instead of referring to various individual platforms of the European RIS authorities. As explained above, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)¹¹⁹. Based on feedback from software services providers in the context of stakeholders' consultation, PM9 would allow to reduce the average cost per vessel by 1% relative to the baseline (i.e. EUR 4.52 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 74. Expressed as present value over 2025-2050, they are estimated at EUR 1.25 million relative to the baseline (in 2022 prices)¹²⁰.

Table 74: Recurrent adjustment costs savings for navigation software service providers due to PM9 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	4.52	4.52	4.52
Adjustment costs savings for navigation software service providers (in EUR)	71,552	72,266	72,876

Source: Elaboration of the contractor (2023)

Adjustment cost savings for vessel operators

¹¹⁹ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

¹²⁰ Part of these costs savings benefiting software provides may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

PM9 is expected to lead to significant recurrent adjustment costs savings for vessel operators for voyage planning. While several national RIS portals had to be consulted by a vessel operator for voyage planning in the baseline, all relevant information is now offered by a single portal within RIS COMEX (EURIS portal). In the baseline scenario the time required for preparing an international trip is estimated at 15 minutes. In PM9, a 50% reduction in the time required for preparing an international voyage is assumed (7.5 minutes) from 2026 onwards relative to the baseline, based on stakeholders' feedback. The recurrent adjustment costs savings for vessel operators are derived based on the time saved for the preparation of a trip, the labour cost per hour (EUR 26.7 per hour¹²¹) and the projected number of border crossings and are provided in Table 75. Expressed as present value over 2025-2050, they are estimated at EUR 37.16 million relative to the baseline (in 2022 prices).

Table 75: Recurrent adjustment costs savings for vessels operators due to PM9 relative to the baseline (in million EUR, in 2022 prices)

	2030	2040	2050
Number of border crossings per year	443,324	446,395	452,776
Adjustment costs savings for vessel operators (in million EUR)	1.48	1.49	1.51

Source: Elaboration of the contractor (2023)

Administrative cost savings for vessel operators

CEERIS was developed under the RIS COMEX banner. This tool should enable vessel operators on the Danube to benefit of a one-stop-shop application for electronic reporting of cargo and voyage data. When the use of RIS COMEX, including thus the CEERIS tool, becomes mandatory, vessel operators on the Danube will benefit from a single electronic notification of cargo data. Based on the interviews and stakeholders' survey, repeated notifications take around 15 minutes per vessel operator. PM9 is expected to reduce the share of repeated notifications by 8 percentage points relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7 per hour¹²²), the administrative cost savings for vessels operators due to PM9 relative to the baseline are provided in Table 76. Expressed as present value over 2025-2050, they are estimated at EUR 3.9 million relative to the baseline.

Table 76: Recurrent administrative costs savings for vessels operators due to PM9 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
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¹²¹ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

¹²² Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

	2030	2040	2050
Number of border crossings requiring repeated notifications in the baseline	132,997	133,918	135,833
Reduction in the number of repeated notifications due to PM9 relative to the baseline	34,534	34,773	35,271
Administrative costs savings for vessel operators due to PM9 (in EUR)	223,407	224,953	228,175

Source: Elaboration of the contractor (2023)

For the purpose of the application of the ‘one in, one out’ approach, the average reduction in the number of repeated notifications over 2026-2035 has been estimated at 34,448 per year relative to the baseline and the average costs saved per repeated notification at EUR 6.5. Thus, the average annual administrative costs savings for vessel operators are estimated at EUR 0.22 million relative to the baseline.

PM10: Involve CESNI in the development and adoption of technical specifications

To ensure faster development of standards, this measure will designate CESNI (the European Committee for drawing up standards in the field of inland navigation) as the relevant body for developing RIS related standards. CESNI has already been designated as a standard setting body in Directive(EU) 2016/1629 on Technical Requirements for inland waterway vessels and Directive (EU) 2017/2397 on professional qualifications in inland navigation.

Adjustment costs for national public authorities / European Commission

There is already a CESNI working group responsible for RIS standards. Therefore, PM10 can be understood as formalising a mandate to CESNI¹²³ for the development of the technical specifications. In this context, this is a task that can be considered within the mandate of the working group and, therefore it is not expected to lead to additional costs relative to the baseline even if the work programme should be adapted.

Adjustment cost savings for vessel operators

Vessel operators might benefit from faster application of standards fostered by stronger engagement of CESNI. This is, however, hard to quantify and the magnitude of the effect is expected to be limited.

PM11: Link the RIS requirements with those of the TEN-T Regulation

This measure would seek at aligning the scope of the RIS Directive with the scope of the TEN-T Regulation. Currently, all interconnected waterways of CEMT class IV and higher (which refers to the size of the vessel they can accommodate) are within

¹²³ Note that CESNI is financed by the Commission through a grant agreement. Therefore, the funds are transferred from the Commission to CESNI.

the scope of the RIS Directive. Member States may decide to include further waterways in this scope (for example Italy, Spain and Portugal). This scope does not match the TEN-T network, which with its current proposed revision will not refer any more to CEMT classification but will be based on the characteristics of the waterways themselves.

Under PM11, the scope of the RIS Directive is aligned with that of the TEN-T Regulation, which corresponds to the waterways of international importance. The waterways currently in the scope of the RIS Directive have a length of 14,400 km while the waterways under TEN-T have a length of 13,000 km. As a consequence, up to 1,400 km of waterways would potentially not be covered by the RIS provisions. Under this measure, Member States would still be able to voluntarily extend the RIS requirements to other parts of their network beyond what is in the TEN-T network.

The majority of these waterways appear to be in the Netherlands, which already applies RIS. During the interviews the Dutch authorities indicated that they already now compile information outside the scope of the current RIS Directive. As the majority of the 1,400 km that would fall out of scope of the new Directive are within the Netherlands, it is assumed that they will remain in the network on a voluntary basis. Furthermore, given the international nature of IWT traffic, it is unlikely that a vessel operator operating in the Dutch network will not (even partly) enter waterways covered under RIS, and would thus be confronted with the requirements of the Directive. Moreover, for waterways that are currently voluntarily in RIS (e.g. in Italy, Spain and Portugal) and are currently in the TEN-T network, their participation will become obligatory.

Therefore, it is assumed that the change of scope brought by this measure will not lead to a net change in the kilometres coverage, and thus no further economic impacts are considered.

PM12: Develop new standards and technical specifications for the exchange of information related to IWT ports

Data related to ports is not easily available to vessel operators (for example, the dimensions of bridges over port basins and operating times). This is the case even in RIS COMEX, where for example port basins along the German Rhine are missing (this includes important ports for inland navigation such as Duisburg, Dusseldorf, Neuss, Mannheim and Karlsruhe). As this information is missing, skippers have to look up the required information independently on port authority websites. such as how deep the port is in relation to the depth of the channel in the river, as well as where berths are and where loading/unloading can take place. Other relevant questions are whether there is shore power available in the port and whether the vessel can be turned around in the port. Finally, the question is whether bridges in the harbour need to be considered, how high they are when closed and if the bridges can be opened, how these openings can be requested and what the operating times are. This wide amount of information is difficult to obtain now. If ports would be required to collect this information, voyage preparation for inland navigation would become easier. In addition, information is not exchanged with the

ports. Thus, the ports do not always have the vessels' cargo and voyage information and this information has to be reported again at the ports.

The aim of this measure is to develop new standards and technical specifications for the exchange of information to and from IWT ports. These standards will be developed by CESNI and be introduced through an implementing act at a later stage. Building on the information required under the Combined Transport Directive for (static) infrastructure, PM12 will provide real time information for transshipment capacity, berths, etc. It will also provide real time information on the availability of alternative fuels (at least the infrastructure that the Alternative Fuels Infrastructure Regulation¹²⁴ requires), which might increase the uptake of clean technologies by vessels and the utilisation of the infrastructure in the ports¹²⁵. In addition, port infrastructure will be better mapped in many areas where it is currently labelled as empty or as “caution areas” on maps. Overall, PM12 would lead to better data quality for all, leading to simpler travel planning. Under PM12, data exchange with IWT ports would be voluntary, but if RIS users do share data, the standards will need to be applied.

Adjustments costs for national public authorities (ports)

While vessel operators would be able to use this feature on a voluntary basis through RIS, implementation of the new standards and technical specifications at port level is required for making it possible. It was assumed that all 54 core ports of the European TEN-T network for which no RIS data is available would implement the new standards. The DINA study¹²⁶ estimates at EUR 25,000 the investment cost per port (in 2017 prices) for developing information systems. This is equivalent to EUR 29,197 in 2022 prices. Applying this cost to the 54 ports, the total one-off adjustment costs for national public authorities are estimated at EUR 1.58 million relative to the baseline (in 2022 prices).

Administrative costs for national public authorities (ports)

Once the systems are established, national authorities are expected to incur recurrent administrative costs for managing and maintaining the data. According to the DINA study¹²⁷ these represent around 25% of the one-off investment costs¹²⁸.

¹²⁴ Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure

¹²⁵ To be noted that AFIR provides a minimum requirement for inland ports in the TEN-T Network to invest in on-shore power supply connection. Such ports may decide to provide infrastructure beyond these minimum requirements.

¹²⁶ European Commission (2017), Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report.

¹²⁷ European Commission (2017), Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report.

Thus, the administrative costs for national authorities are estimated at EUR 394,159 per year from 2026 onwards relative to the baseline. Expressed as present value over 2025-2050, they are estimated at EUR 6.86 million relative to the baseline (in 2022 prices).

Adjustment costs savings for navigation software services providers

Navigation software services providers currently encounter lots of difficulties to collect data on inland ports. If all inland ports provided reference data and keep this data updated, this would lead to time savings for navigation software suppliers. As explained above, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)¹²⁹. Based on feedback from software services providers in the context of stakeholders' consultation, PM12 would allow to reduce the average cost per vessel by 0.75% relative to the baseline (i.e. EUR 3.39 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 77

Table 68. Expressed as present value over 2025-2050, they are estimated at EUR 0.94 million relative to the baseline (in 2022 prices)¹³⁰.

Table 77: Recurrent adjustment costs savings for navigation software service providers due to PM12 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	3.39	3.39	3.39
Adjustment costs savings for navigation software service providers (in EUR)	53,664	54,199	54,657

Source: Elaboration of the contractor (2023)

¹²⁸ According to the study, the maintenance of digital tools e.g. as a result of service level agreements and license fees, represents approximately 20% of the initial technology investment. Another 5% is attributed to the governance of the required standards and the coordination of the implementation.

¹²⁹ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

¹³⁰ Part of these costs savings benefiting software provides may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

Adjustment costs savings for vessel operators

For trip preparation, an average of 5 minutes per trip is assumed for the ports' section in the baseline. In the process, important information should be retrieved, such as how deep the port is in relation to the depth of the channel, as well as where berths are and where loading/unloading can take place. Other relevant questions are whether there is shore power available in the port and whether the vessel can be turned around in the port. Finally, other relevant questions are whether bridges in the harbour need to be considered, how high they are when closed and if the bridges can be opened, how these openings can be requested and what the operating times are. This wide amount of information is difficult to obtain now.

The new standard and specification about ports will facilitate the voyage preparation and planning for the ports' section. Given that there are 54 core network ports (along the Rhine and Danube) for which data is not yet provided (out of a total of 262 ports) and considering that half of the trips start/end in a port, PM12 could reduce the time for voyage planning by 21% per port call (1 minute saved) relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7 per hour¹³¹), the adjustment costs savings for vessels operators due to PM12 relative to the baseline are provided in Table 78. Expressed as present value over 2025-2050, they are estimated at EUR 2.92 million relative to the baseline.

Table 78: Recurrent adjustment costs savings for vessels operators due to PM12 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of port calls	364,940	367,264	372,403
Adjustment costs savings for vessel operators (in EUR)	167,309	168,375	170,731

Source: Elaboration of the contractor (2023)

Administrative costs savings for vessel operators

Currently, (electronic) cargo reports are not passed on to inland ports. This means that vessel operators have to report again when entering a port. PM12 would remove the need of reporting again to the ports. If ports would start applying these standards, reports could be forwarded, and part of the administrative burden could be alleviated.

Administrative costs savings are expected for all 83¹³² core TEN-T network ports. The time for preparing and (re)submitting the reports is estimated at 10 minutes in the baseline. Considering that half of the trips start/end in a port, PM12 could reduce the number of resubmitted cargo reports by 31% relative to the baseline from 2026

¹³¹ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

¹³² This goes beyond the 54 ports that do not provide data. It is assumed that the core inland ports, due to their importance will be the ones to voluntarily take up this measure.

onwards. Considering the labour cost per hour (EUR 26.7 per hour¹³³), the administrative costs savings for vessels operators due to PM12 relative to the baseline are provided in Table 79. Expressed as present value over 2025-2050, they are estimated at EUR 8.88 million relative to the baseline.

Table 79: Recurrent administrative costs savings for vessels operators due to PM12 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Reduction in the number of resubmitted cargo reports due to PM12 relative to the baseline	114,302	115,030	116,639
Administrative costs savings for vessel operators due to PM12 (in EUR)	508,499	511,738	518,898

Source: Elaboration of the contractor (2023)

For the purpose of the application of the 'one in, one out' approach, the average reduction in the number of resubmitted cargo reports over 2026-2035 has been estimated at 114,006 per year relative to the baseline and the average costs saved per resubmission at EUR 4.4. Thus, the average annual administrative costs savings for vessel operators are estimated at EUR 0.5 million relative to the baseline.

PM13: Require the exchange of information with IWT ports according to new standards and technical specifications

In contrast to PM12, where the exchange of information is voluntary, this measure will require that the exchange of certain data (transshipment capacity, availability of alternative fuels, availability of berths, etc.) between vessels and IWT ports uses the new standards and technical specification. These will be developed through a RIS implementing act.

Adjustment costs for national public authorities (ports)

In PM13, both core and comprehensive ports of the TEN-T network will have to implement the standards. In total, there are 54 core TEN-T network ports and 115 comprehensive TEN-T network ports for which no RIS data is available. The DINA study¹³⁴ estimates at EUR 25,000 the investment cost per port (in 2017 prices) for developing information systems. This is equivalent to EUR 29,197 in 2022 prices. Applying this cost to the 169 ports, the total one-off adjustment costs for national public authorities are estimated at EUR 4.93 million relative to the baseline (in 2022 prices).

Administrative costs for national public authorities (ports)

¹³³ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

¹³⁴ European Commission (2017), Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report.

Once the systems are established, national authorities are expected to incur recurrent administrative costs for managing and maintaining the data. According to the DINA study¹³⁵ these represent around 25% of the one-off investment costs¹³⁶. Thus, the administrative costs for national authorities are estimated at EUR 1.23 million per year from 2026 onwards relative to the baseline. Expressed as present value over 2025-2050, they are estimated at EUR 21.48 million relative to the baseline (in 2022 prices).

Adjustment cost savings for navigation software service providers

As in PM12, if all inland ports provided reference data and keep this data updated, this would lead to time savings for navigation software suppliers. Based on feedback received in the context of stakeholders' consultation, the mandatory provision of reference data by all 182 inland ports of the comprehensive TEN-T network, in addition to the 83 core TEN-T ports, would allow to reduce the average cost per vessel by 1.25% relative to the baseline (i.e. EUR 5.65 saved per vessel) from 2026 onwards. As explained above, in the baseline scenario, the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)¹³⁷. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 80

Table 68. Expressed as present value over 2025-2050, they are estimated at EUR 1.56 million relative to the baseline (in 2022 prices)¹³⁸.

Table 80: Recurrent adjustment costs savings for navigation software service providers due to PM13 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131

¹³⁵ European Commission (2017), Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report.

¹³⁶ According to the study, the maintenance of digital tools e.g. as a result of service level agreements and license fees, represents approximately 20% of the initial technology investment. Another 5% is attributed to the governance of the required standards and the coordination of the implementation.

¹³⁷ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

¹³⁸ Part of these costs savings benefiting software provides may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

	2030	2040	2050
Average costs savings for navigation software service providers per vessel (in EUR)	5.65	5.65	5.65
Adjustment costs savings for navigation software service providers (in EUR)	89,440	90,332	91,095

Source: Elaboration of the contractor (2023)

Adjustment cost savings for vessel operators

PM13 is expected to lead to recurrent adjustment costs savings for vessel operators for the trip preparation. In the baseline, an average of 5 minutes per trip is assumed for trip preparation for the ports' section. There are currently 262 ports in the TEN-T network (core plus comprehensive network). A total of 93 inland ports already provides RIS data while 169 inland ports do not provide RIS data (54 from the core network and 115 from the comprehensive network). Under PM13, all those 169 inland ports will have to report RIS data. Given that half of the trips start/end in a port, PM13 could reduce the time for voyage planning by 65% per port call (3.2 minutes saved) relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7 per hour¹³⁹), the adjustment costs savings for vessels operators due to PM13 relative to the baseline are provided in Table 81. Expressed as present value over 2025-2050, they are estimated at EUR 9.14 million relative to the baseline.

Table 81: Recurrent adjustment costs savings for vessels operators due to PM13 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of port calls	364,940	367,264	372,403
Adjustment costs savings for vessel operators (in EUR)	523,616	526,951	534,324

Source: Elaboration of the contractor (2023)

Administrative cost savings for vessel operators

Under PM13, all 262 inland ports from the core and comprehensive TEN-T network will be automatically receiving the (electronic) cargo reports and therefore, vessel operators will not have to resubmit them. Considering the labour cost per hour (EUR 26.7 per hour¹⁴⁰), the administrative costs savings for vessels operators due to PM13 relative to the baseline are provided in Table 82. Expressed as present value over 2025-2050, they are estimated at EUR 28.35 million relative to the baseline.

Table 82: Recurrent administrative costs savings for vessels operators due to PM13 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
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¹³⁹ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

¹⁴⁰ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

	2030	2040	2050
Reduction in the number of resubmitted cargo reports due to PM13 relative to the baseline	364,940	367,264	372,403
Administrative costs savings for vessel operators due to PM13 (in EUR)	1,623,521	1,633,861	1,656,721

Source: Elaboration of the contractor (2023)

PM14: Improve the harmonisation between RIS and the information services for other modes of transport (e.g. maritime)

Currently the RIS Directive envisages continuity with other modal traffic management services, in particular with maritime. However, no further details are included, or technical standards have been developed along these lines. Therefore, this measure aims to strengthen the interoperability of RIS with other modes of transport. To do so, this measure does not aim to create new or duplicate existing systems but will include a clear requirement in the Directive to create links with systems of other modes like EMSWe¹⁴¹, the Combined Transport Directive and others. In addition, a common data exchange mechanism (such as application programming interfaces) should be developed to enable both systems to access the data functionality of one another. Technical standards to implement these links and ensure compatibility between systems will be developed at a second stage through CESNI and introduced through implementing acts.

Adjustment costs for national public authorities

IT investments by the national public authorities will be needed to integrate RIS information systems with information systems of other modes. The IT investment costs are assumed to be similar to that of the CoRISma project¹⁴². Expressed in 2022 prices, the one-off adjustment costs for the national public authorities are estimated at EUR 3.14 million.

Administrative costs for national public authorities

The annual maintenance costs are assumed to be 25% of the IT investment costs, based on the DINA study¹⁴³. Thus, the recurrent administrative costs for national

¹⁴¹ European Maritime Single Window environment, established by Regulation (EU) 2019/1239.

¹⁴² CoRISMa was a TEN-T project running between January 2014 and December 2015. CoRISMa studied and defined the next steps in the development of River Information Services: RIS enabled Corridor Management on inland waterways aiming at mutually sharing information services among waterway authorities but also sharing those with waterway users and logistic partners in order to optimise the use of inland navigation corridors within the network of European waterways. The European Commission contributed EUR 1,083,204 to the CoRISMa project with a co-financing rate of 41% (expressed in 2014 prices).

¹⁴³ European Commission (2017): *Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report*. According to the study, the maintenance of digital tools e.g. as a result of service level agreements and license fees, represents approximately 20% of the initial technology investment. Another 5% is attributed to the governance of the required standards and the coordination of the implementation.

public authorities are estimated at EUR 0.79 million per year from 2026 onwards. Expressed as present value over 2025-2050, they are estimated at EUR 13.68 million.

Adjustment cost savings for navigation software service providers

PM14 will result into maritime charts (ECDIS) and inland charts (Inland ECDIS) being better aligned and thus to time savings for software service providers. As explained above, in the baseline scenario the average cost for software service providers for introducing the data into their systems is estimated at EUR 452 per year, per vessel (in 2022 prices)¹⁴⁴. According to feedback provided by the RIS software service providers during the second stakeholder survey¹⁴⁵, PM14 would allow to reduce the average cost per vessel by 0.25% relative to the baseline (i.e. EUR 1.13 saved per vessel) from 2026 onwards. The recurrent adjustment costs savings for navigation software service providers for 2030, 2040 and 2050, relative to the baseline, are provided in Table 83. Expressed as present value over 2025-2050, they are estimated at EUR 0.31 million relative to the baseline (in 2022 prices)¹⁴⁶.

Table 83: Recurrent adjustment costs savings for navigation software service providers due to PM14 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of vessels	15,838	15,996	16,131
Average costs savings for navigation software service providers per vessel (in EUR)	1.13	1.13	1.13
Adjustment costs savings for navigation software service providers (in EUR)	17,888	18,066	18,219

Source: Elaboration of the contractor (2023)

PM15: Require sharing of all necessary cross-border data for traffic management and transport management by Member States

Currently not all information provided by vessel operators to authorities is shared with the authorities of other Member States, which creates a challenge when crossing borders as in many cases the information needs to be retransmitted. As an illustrative example, cargo reports are not always transmitted to the next country in

¹⁴⁴ Ludden, V. et al., (2020): *Study supporting the evaluation of Directive 2005/44/EC on Harmonised River Information Services (RIS)*. Ramboll, University of Antwerp and DLA Piper. The average cost in the study is expressed in 2019 prices. For the purpose of this impact assessment, it has been transformed in 2022 prices using the harmonised consumer price index for Belgium from Eurostat because the two navigation software service providers that serve around 90% of the market are based in Belgium.

¹⁴⁵ The feedback has been provided by the two navigation software service providers, based in Belgium, that serve around 90% of the market.

¹⁴⁶ Part of these costs savings benefiting software provides may be passed through to the vessel operators, although it is not possible to assess the share of the costs savings passed through.

the journey, which then is not aware that a vessel with dangerous cargo is approaching its area. For example, this does not happen at the borders between the Netherlands and Wallonia, France and Wallonia, France and Luxembourg, Austria and Germany, and all other borders in the Danube area except of the Austrian-Slovakian border.

This measure would require Member States to share cross-border all necessary data that is required for traffic and transport management. This includes for example information provided by vessel operators regarding the cargo, the position of the vessel, ERI information, but also the exchange of information between authorities such as changes in the navigation parameters, limitations of traffic, speed, etc. This way PM15 aims at facilitating the international exchange of RIS-related data making the planning of journeys more accurate and faster. Under this measure, all the data authorities require would be submitted once the journey starts and then re-shared by the authorities, as well as information generated during the journey. Inland skippers would only have to report their voyage once to a RIS authority, which then automatically transfers the voyage report to other RIS authorities when the vessel enters the management area of the subsequent authority. Both inefficiencies arising from data problems (unrecognisable vessels, due to erroneous linking with the European Hull Index and unrecognisable ISRS codes due to the use of different versions of the reference data) and the lack of digital systems to forward voyage reports (e.g. in the Donau countries) are solved

This measure does not deal with exchanges not made due to personal data concerns, while they are handled by measures PM16 and PM17.

Adjustment costs for national public authorities

The one-off adjustment costs (i.e. investment costs to develop the necessary digital tools that will allow the exchange between the national authorities) for national public authorities due to PM15 are estimated at EUR 5 million in 2025 relative to the baseline. The estimate is based on comparable projects in the rail freight sector (ELETA and its successor EDICT¹⁴⁷).

Administrative cost savings for national public authorities

PM15 is expected to reduce the staff required at borders. Based on different sources summarised in Table 84, it has been estimated that around 87,420 vessels cross borders where a control is established. Based on the interviews during the stakeholders' consultation, border officers spend on average 5 minutes for these controls on each side of the border. Considering the labour cost per hour (EUR 26.7 per hour¹⁴⁸), the administrative costs savings for national public authorities are

¹⁴⁷ ELETA: Electronic Exchange of ETA Information; EDICT: Enhanced Data Interoperability for Combined Transport Stakeholders

¹⁴⁸ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

estimated at EUR 388,908 per year from 2026 onwards relative to the baseline. Expressed as present value over 2025-2050, they are estimated at EUR 6.77 million relative to the baseline (in 2022 prices).

Table 84: Border crossings and controls

Border	Location	Source	Number of vessels
NL <-> BE	Lanaye	Voies Hydrauliques Wallone ¹⁴⁹	13,718
BE <-> FR	French border, Meuse	Voies Hydrauliques Wallone	1,040
BE <-> FR	French border, Escaut	Voies Hydrauliques Wallone	7,555
FR <-> LU	Grevenmacher lock	Lu Stat ¹⁵⁰	4,828
DE <-> AT	Aschach lock	Statistic.at ¹⁵¹	3,939
SK <-> HU	Gabcikovo lock	Common Danube Report 2018 ¹⁵²	13,361
HU <-> HR			13,361
HR <-> RS			13,361
RS <-> RO	Iron Gate I	Common Danube Report 2018	13,363
DE <-> CZ	Locks Usti Nad Labem	Idnes.cz ¹⁵³	1,000
DE <-> PL	Schiffshebewerk Niederfinow	Verkehrsbericht 2021 ¹⁵⁴	1,894
Total			87,420

Source: Elaboration of the contractor (2023)

Administrative cost savings for vessel operators

PM15 (included in POC) will eliminate the need for vessel operators to resubmit the electronic cargo reports for border crossing where this is still required (i.e. in 30% of the border crossings in the baseline). Vessel operators would only have to report their voyage once to a RIS authority, which then automatically transfers the voyage report to other RIS authorities when the vessel enters the management area of the subsequent authority. However, considering the synergies with PM8 and PM9 (both included in POC), PM15 is expected to reduce the share of repeated notifications by

¹⁴⁹ <http://voies-hydrauliques.wallonie.be/opencms/opencms/fr/nav/navstat/navstat.do?path=tr&per=2022&vn=21&val=N&display=T&pas=A&col=CLA>

¹⁵⁰ [https://lustat.statec.lu/vis?lc=en&fs\[0\]=Topics%2C1%7CEnterprises%23D%23%7CTransport%23D6%23&fs\[1\]=Topics%2C2%7CEnterprises%23D%23%7CTransport%23D6%23%7CMaritime%20and%20fluvial%20transport%23D63%23&pg=0&fc=Topics&df\[ds\]=ds-release&df\[id\]=DF_D6401&df\[ag\]=LU1&df\[vs\]=1.0&pd=2015%2C&dq=.A.&ly\[rw\]=SPECIFICATION%2CDIRECTION&ly\[cl\]=TIME_PERIOD](https://lustat.statec.lu/vis?lc=en&fs[0]=Topics%2C1%7CEnterprises%23D%23%7CTransport%23D6%23&fs[1]=Topics%2C2%7CEnterprises%23D%23%7CTransport%23D6%23%7CMaritime%20and%20fluvial%20transport%23D63%23&pg=0&fc=Topics&df[ds]=ds-release&df[id]=DF_D6401&df[ag]=LU1&df[vs]=1.0&pd=2015%2C&dq=.A.&ly[rw]=SPECIFICATION%2CDIRECTION&ly[cl]=TIME_PERIOD)

¹⁵¹ <https://www.statistik.at/en/statistics/tourism-and-transport/freight-transport/freight-transport-on-inland-waterways>

¹⁵² <http://www.plovput.rs/file/danube-stream/common-danube-report-2018.pdf>

¹⁵³ https://www.idnes.cz/bydleni/architektura/strekov.A120322_110822_architektura_web

¹⁵⁴ https://www.gdws.wsv.bund.de/SharedDocs/Downloads/DE/Verkehrsberichte/Verkehrsbericht_2021.pdf?__blob=publicationFile&v=4

2 percentage points relative to the baseline from 2026 onwards¹⁵⁵. Based on the interviews and stakeholders' survey, repeated notifications take around 15 minutes per vessel operator. Considering the labour cost per hour (EUR 26.7 per hour¹⁵⁶), the administrative cost savings for vessels operators due to PM15 relative to the baseline are provided in Table 85. Expressed as present value over 2025-2050, they are estimated at EUR 1.11 million relative to the baseline.

Table 85: Recurrent administrative costs savings for vessels operators due to PM15 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of border crossings requiring repeated notifications in the baseline	132,997	133,918	135,833
Reduction in the number of repeated notifications due to PM15 (considering the synergies with PM8 and PM9) relative to the baseline	9,846	9,914	10,056
Administrative costs savings for vessel operators due to PM15 (in EUR)	63,696	64,136	65,054

Source: Elaboration of the contractor (2023)

PM16: Specify more clearly the cases for exchange of personal data

Currently the main challenge regarding the personal data in RIS relates to the information on the position of the vessel through AIS (Automatic Identification System).

In 2006, the inland shipping sector decided to adopt AIS, provided that certain conditions would be met. A covenant between government and industry made clear agreements on the introduction of AIS:

- The sector would cooperate in a voluntary introduction of AIS on condition that the state bore the cost
- The government would guarantee privacy
- Only position and identification of ships would be transmitted with AIS
- AIS would be seen as an important prerequisite for the further development of River Information Services (RIS)

Box 1: Texts covenant

¹⁵⁵ As explained, in the baseline scenario 30% of the border crossings require to resubmit the electronic cargo reports. PM8 reduces the share of repeated notifications by 20 percentage points relative to the baseline and PM9 by another 8 percentage points. Therefore, the elimination of the need to resubmit the electronic cargo reports in PM15 (in combination with PM8 and PM9) leads to a reduction in the share of repeated notifications by 2 percentage points relative to the baseline.

¹⁵⁶ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

Article 8

1. Following the independent investigation into the possibilities of AIS (UN/IMO Automatic Identification System) and AI-IP (Automatic Identification with Internet Protocol), the State chooses, for reasons of increasing safety, to introduce AIS as referred to in the RIS Directive 2005/44/EU for inland waterways. An obligation to have AIS on board is not foreseen before 2009.
2. The industry parties respect this choice from the perspective of increased safety. It is essential to them that:
 - a. the State is prepared to play a role in financing the purchase and installation of AIS on board inland vessels during the period of voluntary introduction, for a part to be determined. The assumption here is that the European Commission agrees.
 - b. for privacy reasons the AIS message to be broadcast will be limited to the position of the ship and identification.
3. If parties agree on the points mentioned in article 2, the industry parties are prepared, under the current privacy safeguards, to cooperate loyally in the voluntary introduction of AIS. (...)"

As explained in problem driver 5, vessel operators (in particular SMEs) who also reside in the vessel, consider that information regarding the position should be considered personal data. Due to these concerns, and as it is not always clear on which basis the data is being processed and whether this is allowed, authorities are reluctant to process and transmit positioning information to other authorities. This in turn leads to resubmission of the information by the vessel operators to different national authorities or refusal to share information.

Under this measure, the RIS Directive would provide more clarity on the specific cases and legal basis where exchange of personal data would be justified (e.g. for reasons of safety, to streamline the process, etc.). This would provide legal clarity both for Member States and other stakeholders, and thus allow a reduction in the number of resubmissions. The expectation is that if it is made clear in which cases AIS data can and cannot be shared, the procedure for collecting port charges will become simpler. Barges will no longer have to report in ports, authorities will have to make less effort to identify vessels. Therefore, economic impacts are assessed for these two categories of stakeholders.

This measure is designed to work in complementarity with PM12, PM13 and PM15 as it covers a specific case (personal data) that they do not.

Adjustment costs for national public authorities (ports)

For PM16 to be implemented, all TEN-T inland ports would have to develop an application where the position of the vessel through AIS can be used for port-related matters, such as berth management and collection of port fees¹⁵⁷. The investment costs for such an application are estimated at EUR 5,839 per port (in 2022 prices) as identified in DINA study¹⁵⁸. The total one-off adjustments costs for

¹⁵⁷ This application is considered as separate/has other functionality to those under PM12 and PM13, as these last ones do not consider AIS among the information to be shared.

¹⁵⁸ European Commission (2017): *Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report.*

all 265 ports are thus estimated at EUR 1.55 million in 2025 relative to the baseline.

Administrative costs for national public authorities (ports)

PM16 is also expected to lead to recurrent administrative costs for managing and maintaining the systems. Based on the DINA study they are assumed to be 25% of the investment costs, or EUR 1,460 per port. Thus, total recurrent administrative costs are estimated at EUR 386,860 per year relative to the baseline from 2026 onwards. Expressed as present value over 2025-2050, they are estimated at EUR 6.74 million relative to the baseline.

Administrative costs savings for vessel operators

Making clear in which cases AIS data can and cannot be shared, the procedure for collecting port charges would become simpler. Barges would no longer have to report in ports and authorities would have to make less effort to identify vessels. Currently, there are 120 ports in Europe where port dues are levied, mainly located in the Netherlands and some on the Rhine and Danube. It is estimated that if the cases for data-sharing would be better clarified the number of resubmitted reports to ports would decrease by 20% relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7 per hour¹⁵⁹), the administrative costs savings for vessels operators due to PM16 relative to the baseline are provided in Table 86. Expressed as present value over 2025-2050, they are estimated at EUR 5.67 million relative to the baseline.

Table 86: Recurrent administrative costs savings for vessels operators due to PM16 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of port calls	364,940	367,264	372,403
Reduction in the resubmission of electronic cargo reports to ports relative to the baseline	72,988	73,453	74,481
Administrative costs savings for vessel operators due to PM16 (in EUR)	324,704	326,772	331,344

Source: Elaboration of the contractor (2023)

For the purpose of the application of the 'one in, one out' approach, the average reduction in the number of resubmitted cargo reports over 2026-2035 has been estimated at 72,799 per year relative to the baseline and the average costs saved per resubmission at EUR 4.4. Thus, the average annual administrative costs savings for vessel operators are estimated at EUR 0.32 million relative to the baseline.

PM17: Develop templates and standards for the exchange of personal data

¹⁵⁹ Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

This measure will develop and mandate new standards and technical specifications for the exchange of personal information when this is required by national or international legislation. This measure goes beyond measure 16, in that it will not only clarify the cases when personal data can be exchanged but will define the exact templates and standards to be followed when such an exchange can take place, in line with existing legal provisions. It will thus provide a further step of harmonisation. It would also provide information on why this is proportionate (i.e. on what is aimed to be achieved) and why it is the least intrusive way to exchange personal data to achieve its goals).

Adjustment costs for national public authorities (ports)

For PM17 to be implemented, all TEN-T inland ports would have to develop an application where the position of the vessel through AIS can be used for port-related matters, such as berth management and collection of port fees¹⁶⁰. The application would need to additionally accommodate harmonised features (e.g. templates and standards to be followed) relative to PM16. The investment costs for such an application are estimated at EUR 10,219 per port (in 2022 prices) as identified in DINA study¹⁶¹. The total one-off adjustments cost for all 265 ports are thus estimated at EUR 2.71 million in 2025 relative to the baseline.

Administrative costs for national public authorities (ports)

PM16 is also expected to lead to recurrent administrative costs for managing and maintaining the systems. Based on the DINA study they are assumed to be 25% of the investment costs, or EUR 2,555 per port. Thus, total recurrent administrative costs are estimated at EUR 677,005 per year relative to the baseline from 2026 onwards. Expressed as present value over 2025-2050, they are estimated at EUR 11.79 million relative to the baseline.

Administrative cost savings for vessel operators

By clarifying instances when AIS data can and cannot be shared, the procedure for collecting port charges would become simpler. In Europe, port dues are levied in 120 ports, which are primarily located in the Netherlands, but some also along the Rhine and Danube. It is estimated that if the cases for data-sharing would be better clarified the number of resubmitted reports to ports would decrease by 30% relative to the baseline from 2026 onwards. Considering the labour cost per hour (EUR 26.7

¹⁶⁰ This application is considered as separate/has other functionality to those under PM12 and PM13, as these last ones do not consider AIS among the information to be shared.

¹⁶¹ European Commission (2017): *Digital inland waterway areas. Towards a digital inland waterway area and digital multimodal nodes. Final report*. These investment costs are 75% higher than those in PM16.

per hour¹⁶²), the administrative costs savings for vessels operators due to PM17 relative to the baseline are provided in Table 87. Expressed as present value over 2025-2050, they are estimated at EUR 8.51 million relative to the baseline.

Table 87: Recurrent administrative costs savings for vessels operators due to PM17 relative to the baseline (in EUR, in 2022 prices)

	2030	2040	2050
Number of port calls	364,940	367,264	372,403
Reduction in the resubmission of electronic cargo reports to ports relative to the baseline	72,988	73,453	74,481
Administrative costs savings for vessel operators due to PM17 (in EUR)	324,704	326,772	331,344

Source: Elaboration of the contractor (2023)

Summary of costs and costs savings

Drawing on the detailed explanations by policy measure and stakeholder group above, Table 88 to Source: Elaboration of the contractor (2023)

Table 95 provide a summary of the costs and costs savings by policy option, policy measure and stakeholder group.

Table 88: Recurrent costs and costs savings for vessels operators by policy option and measure in 2030, 2040 and 2050, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
Administrative costs	0.00	0.00	0.00	0.00	0.00	0.00	19.74	20.16	20.60
PM5							19.74	20.16	20.60
Adjustment costs savings	1.69	1.70	1.73	3.48	3.50	3.55	18.70	18.04	18.98
PM1	0.49	0.50	0.50						
PM2	0.35	0.36	0.36	0.35	0.36	0.36			
PM3							0.18	0.18	0.18
PM4				0.63	0.64	0.65	0.63	0.64	0.65
PM5							15.04	14.36	15.24
PM6	0.85	0.85	0.86	0.85	0.85	0.86	0.85	0.85	0.86
PM9				1.48	1.49	1.51	1.48	1.49	1.51
PM12				0.17	0.17	0.17			
PM13							0.52	0.53	0.53
Administrative costs savings	0.61	0.62	0.62	1.63	1.64	1.66	2.97	2.99	3.03
PM7	0.29	0.29	0.29						
PM8				0.57	0.58	0.59	0.57	0.58	0.59
PM9				0.22	0.22	0.23	0.22	0.22	0.23
PM12				0.51	0.51	0.52			
PM13							1.62	1.63	1.66
PM15							0.06	0.06	0.07
PM16	0.32	0.33	0.33	0.32	0.33	0.33			
PM17							0.49	0.49	0.50

¹⁶² Weighted average of the tariff per hour for non-manual workers (ISCO 8 - Plant and machine operators and assemblers) in the 13 Member State in the scope of RIS. It is based on Eurostat Structure of earnings survey and expressed in 2022 prices.

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
Net costs savings	2.30	2.32	2.35	5.11	5.14	5.22	1.93	0.88	1.42

Source: Elaboration of the contractor (2023)

Table 89: Recurrent costs and costs savings for vessels operators by policy option and measure, expressed as present value over 2025-2050, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
Administrative costs	0.00	0.00	367.50
PM5			367.50
Adjustment costs savings	29.56	72.12	323.99
PM1	8.61		
PM2	6.16	6.16	
PM3			3.08
PM4		11.09	11.09
PM5			248.72
PM6	14.79	14.79	14.79
PM9		37.16	37.16
PM12		2.92	
PM13			9.14
Administrative costs savings	10.68	28.47	51.89
PM7	5.01		
PM8		10.02	10.02
PM9		3.90	3.90
PM12		8.88	
PM13			28.35
PM15			1.11
PM16	5.67	5.67	
PM17			8.51
Net costs savings	40.24	100.59	8.37

Source: Elaboration of the contractor (2023)

Table 90: Adjustment costs savings for navigation software services providers by policy option and measure in 2030, 2040 and 2050, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
PM1	0.07	0.07	0.07						
PM2	0.04	0.04	0.04	0.04	0.04	0.04			
PM3							0.02	0.02	0.02
PM4				0.14	0.14	0.15	0.14	0.14	0.15
PM6	0.14	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.15
PM9				0.07	0.07	0.07	0.07	0.07	0.07
PM12				0.05	0.05	0.05			
PM13							0.09	0.09	0.09
PM14				0.02	0.02	0.02	0.02	0.02	0.02
Total adjustment costs savings	0.25	0.25	0.26	0.47	0.47	0.47	0.48	0.49	0.49

Source: Elaboration of the contractor (2023)

Table 91: Adjustment costs savings for navigation software services providers by policy option and measure, expressed as present value over 2025-2050, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
PM1	1.25		
PM2	0.63	0.63	
PM3			0.31
PM4		2.50	2.50
PM6	2.50	2.50	2.50
PM9		1.25	1.25
PM12		0.94	
PM13			1.56
PM14		0.31	0.31
Total adjustment costs savings	4.38	8.13	8.44

Source: Elaboration of the contractor (2023)

Table 92: Recurrent costs and costs savings for national public authorities by policy option and measure in 2030, 2040 and 2050, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
Administrative costs	1.97	1.97	1.97	4.29	4.29	4.29	5.91	5.91	5.91
PM2	0.92	0.92	0.92	0.92	0.92	0.92			
PM3							0.65	0.65	0.65
PM4				1.14	1.14	1.14	1.14	1.14	1.14
PM5							0.77	0.77	0.77
PM6	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
PM12				0.39	0.39	0.39			
PM13							1.23	1.23	1.23
PM14				0.79	0.79	0.79	0.79	0.79	0.79
PM16	0.39	0.39	0.39	0.39	0.39	0.39			
PM17							0.68	0.68	0.68
Administrative cost savings	0.62	0.68	0.74	1.75	1.86	1.97	2.14	2.24	2.36
PM7	0.62	0.68	0.74						
PM8				1.25	1.36	1.47	1.25	1.36	1.47
PM9				0.50	0.50	0.50	0.50	0.50	0.50
PM15							0.39	0.39	0.39
Net costs	1.34	1.29	1.23	2.54	2.43	2.31	3.78	3.67	3.55

Source: Elaboration of the contractor (2023)

Table 93: One-off adjustment costs for national public authorities by policy option and measure in 2025, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
PM2	2.76	2.76	
PM4		4.55	4.55
PM5			3.07
PM7	1.25		
PM8		1.25	1.25
PM9		3.50	3.50
PM12		1.58	
PM13			4.93
PM14		3.14	3.14
PM15			5.00
PM16	1.55	1.55	
PM17			2.71
Total one-off adjustment costs	5.56	18.33	28.15

Source: Elaboration of the contractor (2023)

Table 94: Recurrent and one-off costs and costs savings for national public authorities by policy option and measure, expressed as present value over 2025-2050, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
Adjustment costs	5.56	18.33	28.15
PM2	2.76	2.76	
PM4		4.55	4.55
PM5			3.07
PM7	1.25		
PM8		1.25	1.25
PM9		3.50	3.50
PM12		1.58	
PM13			4.93
PM14		3.14	3.14
PM15			5.00
PM16	1.55	1.55	
PM17			2.71
Administrative costs	34.9	75.3	104.3
PM2	16.02	16.02	
PM3			11.97
PM4		19.81	19.81
PM5			13.35
PM6	12.18	12.18	12.18
PM12		6.86	
PM13			21.48
PM14		13.68	13.68
PM16	6.74	6.74	
PM17			11.79
Administrative cost savings	11.45	30.60	37.37
PM7	11.45		
PM8		22.89	22.89
PM9		7.71	7.71
PM15			6.77
Net costs	29.05	63.02	95.04

Source: Elaboration of the contractor (2023)

Table 95: One-off adjustment costs for the European Commission by policy option and measure in 2025, relative to the baseline (in million EUR, in 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
PM1	0.47		
Total one-off adjustment costs	0.47	0.00	0.00

Source: Elaboration of the contractor (2023)

5.3 Impacts on modal shift and external costs

PM4 and PM14 are expected to improve the planning and efficiency of operations, which will ultimately lead to better inclusion of inland waterways transport into the logistics chain. The reliability of multimodal chains would improve which would also increase the attractiveness of inland waterways transport. Consequently, a modal shift from road to inland waterway transport is expected. Due to the synergies between the two measures, their impacts on modal shift are assessed together.

Based on the results of a stated preference survey run as part of a 2019 TRT study¹⁶³, a linear correlation between punctuality and modal shift potential has been identified. More specifically, the study indicates that for each 10% increase in punctuality a 6.1% increase in transport demand could be expected. To determine the impact on reliability for the inland waterway sector, information on average waiting times at locks has been collected in the context of the impact assessment support study and the impact on reliability (90% value) has been derived based on desk-research¹⁶⁴.

Table 96: Average waiting times at locks and impact on reliability, in minutes

	Average waiting time	90% value
Oranjesluizen	18	42
Houtribsluizen	18	38
Margrietsluis	19	36
Gaarkeukensluis	16	32
Oostersluis	22	45
Delden	32	82
Grave	21	42
Sint Andries	21	45
Weurt	16	36
Schijndel	20	41
Hansweert	14	30
Krammersluizen	25	53
Kreekraksluizen	20	45
Volkeraksluizen	24	40
Average	20	43

Source: Elaboration of the contractor (2023)

¹⁶³ <https://www.corridor-rhine-alpine.eu/files/downloads/others/Transport%20Market%20Study%202018.pdf>

¹⁶⁴ IMA (2021) of the Department of Public Works.

The table shows an average waiting time per lock of 20 minutes and a reliability value of 43 minutes (i.e. variance of 23 minutes). Moreover, a barge passes an average number of 4 locks per voyage^{165,166}. In the baseline scenario, the total travel time for freight inland waterways transport is estimated at 12 million hours in 2025, 12.19 million hours in 2030 and 12.42 million hours in 2050, while the waiting time at 0.54 million hours in 2025, 0.55 million hours in 2030 and 0.56 million hours in 2050. Based on this, the reliability of travel time in inland shipping is estimated at 95.5% in the baseline scenario. Information on the position of the ship and the expected arrival time of ships can increase the reliability by a maximum of 4.5%. Drawing on the correlation between the increase in punctuality and transport demand from the TRT study, the model shift potential is estimated at 2.7% relative to the baseline. This modal shift potential is only applied to intermodal transport, as not all goods transported by road may be suitable for transport by IWT, while the IWT network is much limited compared to that of road. Drawing on the evolution of freight IWT activity in the baseline scenario and the model shift potential, the transport activity shifted from road to freight IWT is estimated at 0.35 billion tkm in 2026, 0.38 billion tkm in 2030 and 0.45 billion tkm in 2050.

Table 97: Impact on freight inland waterways transport activity relative to the baseline

	2026	2030	2040	2050
Freight IWT activity in the baseline scenario (Gtkm)	167.0	178.2	194.7	211.8
Travel time in the baseline (million hours)	12.04	12.19	12.26	12.42
Waiting time in the baseline (million hours)	0.54	0.55	0.55	0.56
Reliability	95.5%	95.5%	95.5%	95.5%
Effect of more reliable travel planning	4.5%	4.5%	4.5%	4.5%
Modal shift potential	2.7%	2.7%	2.7%	2.7%
Shift from road to freight IWT activity relative to the baseline (Gtkm)	0.35	0.38	0.41	0.45

Source: Elaboration of the contractor (2023)

Environmental impacts and external costs

The CO₂ emissions reductions are driven by the combined effect of PM4 and PM14 on the shift from road to inland waterways transport, and by the energy savings in PM5. To calculate the CO₂ emissions reductions due PM4 and PM14, the changes in the transport activity relative to the baseline and the CO₂ emissions intensity for freight inland waterways transport and road transport (expressed in tCO₂ per tkm) have been used. The CO₂ emissions intensity draws on the baseline scenario developed with the PRIMES-TREMOVE model. It should be noted that the CO₂ intensity for both road transport and IWT reduces significantly over time in the baseline scenario, driven by improvements in energy efficiency and the uptake of renewable and low carbon fuels. For PM5, the CO₂ emissions savings have been derived based on the energy savings and the CO₂ intensity expressed in tCO₂ per ktoe from the baseline scenario developed with the PRIMES-TREMOVE model. The

¹⁶⁵ Rijkswaterstaat's Basic Travel File (2019), including around 375,000 trips.

¹⁶⁶ At trip level, the variance is estimated at 47 minutes.

reduction in the external costs of CO₂ emissions has been calculated based on the CO₂ emissions savings and the unit costs from the 2019 Handbook on external costs of transport.

A similar approach has been used for air pollutant emissions.

Table 98: Impact on CO₂ emissions relative to the baseline in 2030, 2040 and 2050 (kt of CO₂)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
CO₂ emissions (kt)	0.0	0.0	0.0	-22.5	-14.3	-5.6	-45.2	-32.3	-14.5
PM5							-22.7	-18.0	-9.0
PM4&PM14				-22.5	-14.3	-5.6	-22.5	-14.3	-5.6

Source: Elaboration of the contractor (2023)

Table 99: Cumulative impact on CO₂ emissions for 2025-2050 relative to the baseline (kt of CO₂)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
CO₂ emissions (kt)	0.0	-389.1	-832.1
PM5			-443.0
PM4&PM14		-389.1	-389.1

Source: Elaboration of the contractor (2023)

Table 100: Impact on air pollutant emissions relative to the baseline in 2030, 2040 and 2050 (tonnes)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
PM emissions (in tonnes)	0.0	0.0	0.0	3.2	2.5	1.6	-17.0	-11.1	-6.3
PM5							-20.3	-13.6	-7.9
PM4&PM14				3.2	2.5	1.6	3.2	2.5	1.6
NOx emissions (in tonnes)	0.0	0.0	0.0	19.7	29.2	21.3	-367.6	-231.5	-129.5
PM5							-387.3	-260.7	-150.8
PM4&PM14				19.7	29.2	21.3	19.7	29.2	21.3

Source: Elaboration of the contractor (2023)

Table 101: Cumulative impact on air pollutant emissions for 2025-2050 relative to the baseline (tonnes)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
PM emissions (in tonnes)	0.0	60.8	-338.8
PM5			-399.6
PM4&PM14		60.8	60.8
NOx emissions (in tonnes)	0.0	603.2	-6552.3
PM5			-7,155.5
PM4&PM14		603.2	603.2

Source: Elaboration of the contractor (2023)

Table 102: Impact on external costs of CO2 emissions, air pollution emissions, noise and habitats relative to the baseline in 2030, 2040 and 2050 (in million EUR, 2022 prices)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
CO2 emissions	0.0	0.0	0.0	-2.7	-3.1	-1.8	-5.4	-7.1	-4.6
PM5							-2.7	-3.9	-2.9
PM4&PM14				-2.7	-3.1	-1.8	-2.7	-3.1	-1.8
Air pollution	0.0	0.0	0.0	0.7	0.9	0.6	-9.4	-6.0	-3.3
PM5							-10.2	-6.8	-4.0
PM4&PM14				0.7	0.9	0.6	0.7	0.9	0.6
Noise	0.0	0.0	0.0	-2.0	-2.2	-2.4	-2.0	-2.2	-2.4
PM4&PM14				-2.0	-2.2	-2.4	-2.0	-2.2	-2.4
Habitats	0.0	0.0	0.0	-2.0	-2.1	-2.3	-2.0	-2.1	-2.3
PM4&PM14				-2.0	-2.1	-2.3	-2.0	-2.1	-2.3
Total reduction in external costs	0.0	0.0	0.0	-5.9	-6.6	-5.9	-18.7	-17.4	-12.7

Source: Elaboration of the contractor (2023)

Table 103: Impact on external costs of CO2 emissions, air pollution emissions, noise and habitats relative to the baseline – expressed as present value over 2025-2050 (in million EUR, 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
CO2 emissions	0.0	-48.6	-105.2
PM5			-56.6
PM4&PM14		-48.6	-48.6
Air pollution	0.0	13.1	-127.6
PM5			-140.7
PM4&PM14		13.1	13.1
Noise	0.0	-36.6	-36.6
PM4&PM14		-36.6	-36.6
Habitats	0.0	-36.2	-36.2
PM4&PM14		-36.2	-36.2
Total reduction in external costs	0.0	-108.4	-305.7

Source: Elaboration of the contractor (2023)

External costs of congestion

The reduction in the external costs of road congestion has been calculated based on the reduction in the road transport activity and the unit costs of congestion from the 2019 Handbook on external costs of transport.

Table 104: Impact on external costs of congestion relative to the baseline in 2030, 2040 and 2050 (in million EUR, 2022 prices)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
Congestion	0.0	0.0	0.0	-4.7	-5.1	-5.6	-4.7	-5.1	-5.6
PM4&PM14				-4.7	-5.1	-5.6	-4.7	-5.1	-5.6

Source: Elaboration of the contractor (2023)

Table 105: Impact on external costs of congestion relative to the baseline – expressed as present value over 2025-2050 (in million EUR, 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
Congestion	0.0	-86.8	-86.8
PM4&PM14		-86.8	-86.8

Source: Elaboration of the contractor (2023)

External costs of accidents

The reduction in the external costs of accidents has been calculated based on the reduction in the road transport activity and the unit costs per fatality from the 2019 Handbook on external costs of transport.

Table 106: Impact on external costs of accidents relative to the baseline in 2030, 2040 and 2050 (in million EUR, 2022 prices)

	Difference to the Baseline								
	PO-A			PO-B			PO-C		
	2030	2040	2050	2030	2040	2050	2030	2040	2050
Accidents (Road)	0.0	0.0	0.0	-6.3	-6.9	-7.5	-6.3	-6.9	-7.5
PM4&PM14				-6.3	-6.9	-7.5	-6.3	-6.9	-7.5

Source: Elaboration of the contractor (2023)

Table 107: Impact on external costs of accidents relative to the baseline – expressed as present value over 2025-2050 (in million EUR, 2022 prices)

	Difference to the Baseline		
	PO-A	PO-B	PO-C
Accidents (Road)	0.0	-115.8	-115.8
PM4&PM14		-115.8	-115.8

Source: Elaboration of the contractor (2023)

5.4 Further considerations on operational aspects

In this section we describe in further detail a number technical and operational aspects which are of relevance and would aid the understanding when considering the effect of the impacts.

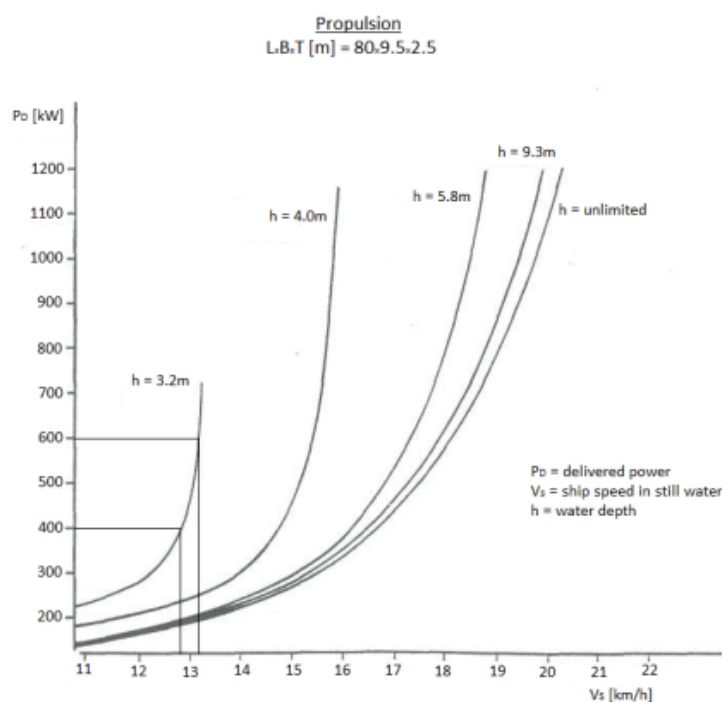
Impact on transport costs of inland waterway operators due to more efficient sailing

One of the aims in revising the RIS Directive is to make the inland navigation sector more competitive and safer, and to contribute towards the European Green Deal objectives. Several measures contribute to increasing transport efficiency. One of the ways to achieve this is by feeding back information on the traffic picture, giving information back to inland shippers on expected waiting times at locks and moveable bridges and (possibly) combining this with advice on the sailing speed. This can help reduce energy consumption and thus contribute to achieving climate protection and environmental goals.

The energy consumption of a barge depends, amongst other things, on the vessel's cruising speed, the resistance the vessel encounters from the water and the depth of the water. Several studies, including Hekkenberg (2017), show a third-power relationship between the amount of propulsion energy required and speed. That is, when a vessel doubles its speed, its energy consumption increases eightfold (2^3). The question this raises is why barges do not always cruise as gently as possible. The reason for this is that, in addition to fuel costs, fixed capital costs and personnel costs weigh heavily on operations. By keeping the turnaround rate high, these charges can be spread over more units of cargo, which actually lowers the unit transport costs. As a result, barges usually operate at economic speed: the speed at which the interplay of variable and fixed costs produces the most favourable outcome.

This is also shown in a more technical way in the figure below where the power-speed diagram of a Johann-Welker-type vessel is presented. The power speed curves are given for different water depths h ranging from 3.2 metres up to unlimited. It can be seen how the power-speed curves become steeper with reduced water depth, caused by the shallow-water effects occurring around the vessel (e.g. increased flow velocities, change of flow direction, change of floating condition of the vessel, etc.). This is most obvious if one looks at the curve for the water depth $h = 3.2$ metres. If the vessel is sailing using 600 kW of the delivered power PD , it would move at a speed VS of approximately 13.3 km/h. If the delivered power would be lowered to 400 kW, the vessel would sail at a speed of approximately 12.8 km/h. For simplicity of the calculation, if we assume that the engine's specific fuel consumption is 0.2 kg/kWh, we can easily determine that with 600 kW of the delivered power the engine is consuming around 120 kilogrammes of fuel per hour, while with 400 kW it is consuming 80 kilogrammes of fuel per hour. That is a fuel saving of 33.3% while only being slower by 0.5 km/h or 3.75%. Most likely, this amount of savings may be not achieved for the entire length of a vessel's voyage due to changing navigation conditions (fairway depth is changing from metre to metre). Nonetheless, this simple calculation shows as an example how easy it could be, under certain circumstances, to save fuel.

Figure 55: Power-speed curves of a Johann Welker type vessel ($L = 80$ m, $W = 9.5$ m, $T = 2.5$ m) for different water depths h , manipulated figure



Source: VBW (1992)

However, there may be circumstances when it is necessary to deviate from this economic speed. Sometimes it pays off to sail faster, often it pays to sail slower. Especially when the vessel has to endure waiting times at locks or moveable bridges, it may be wise to sail with less power. This saves substantial amounts of fuel. To do so, however, it is necessary for the barge master to know the expected waiting times at locks and moveable bridges, and the expected moment of passage at the object. In this way, the sailing speed can be adjusted to current conditions and can be called smart navigation. This principle has been recognised for a long time, also in the context of RIS. For example, the possibility of saving energy was already discussed when the RIS Directive was introduced. However, because since RIS-information now only goes from ship to authority and not vice-versa, the sector has not yet been able to make use of these opportunities, as authorities do not provide actual and accurate information about (expected) traffic conditions.

The fuel-saving potential of this principle varies from voyage to voyage. When ships only travel on a free flowing (major) river, smart navigation in relation to passing structures (bridges, locks) has relatively little impact. But precisely on tributaries (e.g. Moselle, Neckar Main), canal systems (e.g. Main-Danube link) and the main waterways (e.g. between Antwerp, Rotterdam and Amsterdam), quite a lot of fuel can be saved. Although this principle is recognised by almost all stakeholders, little quantitative research has yet been done on the extent of this potential. Prominent (2017) reports a range of 3% to 25%, with an average value of 14%. The CCR (2012) speaks of zero to 10% savings. It is relevant to note that the savings reported are the result of all kinds of measures, ranging from smart sensors on board, to simulator cruises where more information on power conditions is fed back to the skipper. Rijkswaterstaat (2022) did a study using the simulation programme SIVAK (i.e. for traffic flow at locks, also in a corridor) which showed that on the corridors Amsterdam-Tiel (i.e. Amsterdam-Rhine canal) and Rotterdam-Antwerp (i.e. Scheldt-Rhine link) 5 to 13% emissions could be saved¹⁶⁷. In contrast, it showed that on waterways with a narrow profile

¹⁶⁷ Digishape (2022), Effect corridor planning on emissions. Retrieved from https://www.digishape.nl/content/documents/sessies/digishape_discussion_-_sivak_trajectplanner_intro_07022022.pdf

and (more) limited shipping, such as the Lemmer-Delfzijl waterway, there are hardly any savings.

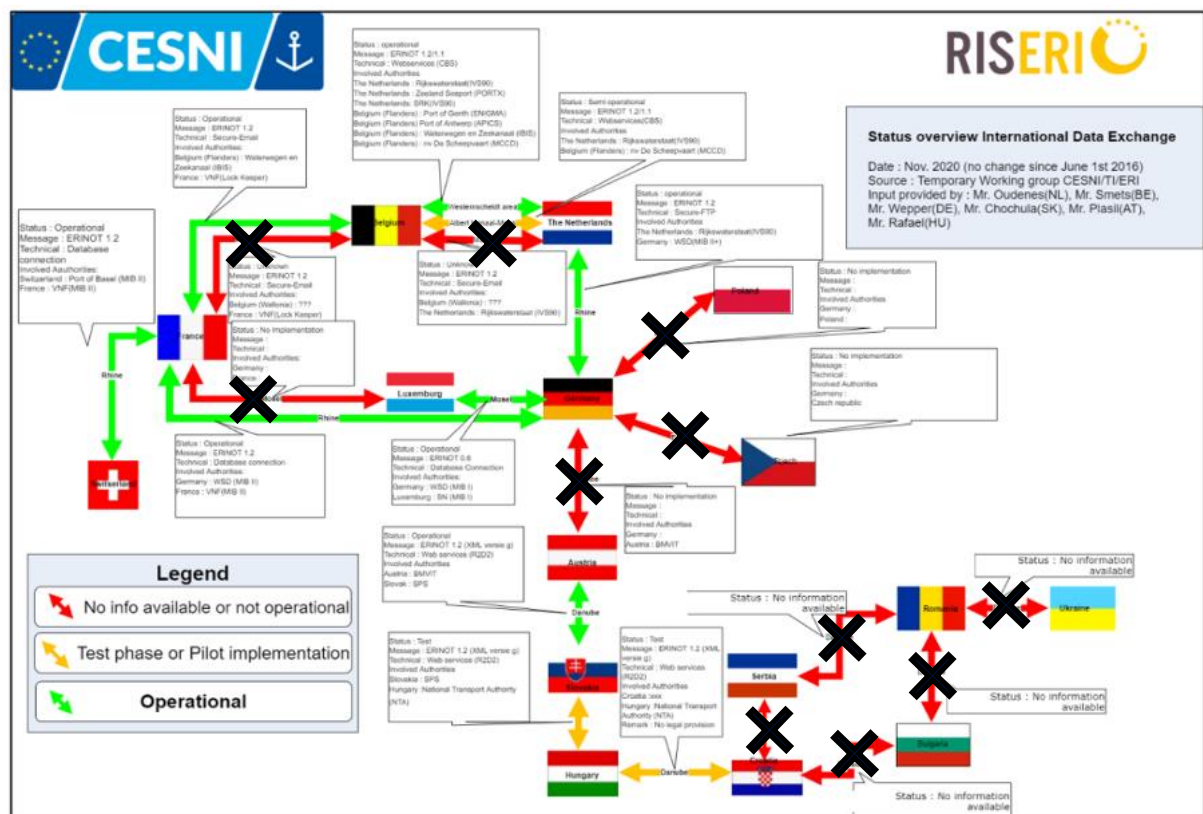
Reporting obligations

For the sake of smooth navigation, safety and statistics, inland shippers are obliged to provide voyage and cargo information to the waterway authorities. This is often done by VHF radio, but nowadays also increasingly electronically. Along strictly secured electronic communication links, vessels and waterway authorities exchange information. As the objective is to avoid having to report the same message several times to waterway authorities, the RIS Directive includes a provision that waterway authorities should exchange the messages. Despite this, there have been complaints from the inland navigation sector for years that this objective has not been sufficiently implemented in practice. As a matter of fact, the electronic reporting obligation is currently not mandatory for all vessels and on all waterways. However, on the Rhine, vessels carrying hazardous substances, carrying containers, carrying passengers and/or longer than 110 metres are obliged to report their data electronically.

In Europe, certain standards (i.e. ERI) have been established for electronic reporting. This has taken the following objectives:

- Enable electronic data interchange (EDI) for reporting to and between competent authorities and facilitate electronic data interchange between parties in inland navigation and with parties in the multimodal transport chain involved in inland navigation
- Avoid multiple reporting of skippers to competent authorities and limit the need to repeatedly provide the same data related to a voyage to different authorities and/or commercial parties
- Provide standards and procedures for the exchange of electronic messages between parties in inland navigation. Public authorities and other parties involved (e.g. ship owners, skippers, shippers, terminals, ports) should exchange their data in accordance with these standards and rules

Figure 56: RIS enabled corridor management



DIWA Masterplan

The diagram above is taken from the DIWA Masterplan (SuAc 2.4: RIS enabled corridor management) and describes the interactions between the various electronic reporting systems in Europe. It can be seen that in the Rhine catchment, the electronic transmission of reports is going relatively well, while in Eastern Europe (i.e. borders between Germany and Poland as well as Germany-Czech Republic) and on the Danube, this does not generally go well.

This is supported by evidence from the RIS evaluation, where many interviewees from different stakeholder groups and different countries agreed with this assessment, and by the examples provided in support of their claims. For example, according to one skipper, on a trip between Constanța and Budapest, he needs to report on his voyage and cargo around five times. Representative associations listed similar examples: several reports from Flushing to Liège; from Basel to Rotterdam; from Constanța to Rotterdam; and even within countries, e.g. Romania and Bulgaria.

In principle, there should be electronic exchange of ERI messages within the Rhine basin. However, the above examples illustrate that things are not always going well. Various reasons for this are mentioned during interviews, for instance:

- The reference data in the ERI data are not always correct and ISRS codes of port locations and terminals are not always supported. This picture is confirmed by IT service providers in inland navigation.
- Ship data (reference to the European Hull Database) are not always recognised, also necessitating a new notification.

Inland shippers still face unnecessary administrative burdens. The cases in the boxes below, coming from EBU 2022, illustrate this.

Box.1: See-river vessel

- The vessel sent itself an ERINOT message via BICS (application developed by the Dutch Directorate-General for Public Works and Water Management). The Wasserschutzpolizei was informed by the Duisburg traffic centre about the alleged absence of an electronic message after which an agent boarded the vessel. Both to the traffic centre and later to the agent on duty, the captain repeatedly indicated that the report had indeed been sent (in this case from the office organisation) and an ERIRSP message of the report made could actually be presented. The officer concerned appears to have replied that this did not count as sufficient evidence for him, and he could fine the captain anyway, (which seemingly did not eventually happen). This incident raises questions about the functioning of the reporting chain (a response message, but the report does not arrive).

Box.2: Inland vessel

- The barge also reported in the Netherlands through BICS. Upon passing through the Nijmegen traffic centre and the Duisburg traffic centre, it was actually visible in the systems. When it subsequently arrived at Oberwesel traffic centre, authorities there held his report was not visible. There seems to have been a discussion between the station and skipper in which the skipper was made responsible for the error. Incidentally, of course, a verbal re-notification could have been simply made, (although of course this should have been unnecessary). This incident again raises questions about the reliability of the land-based reporting chain.

Mandatory travel plan notifications

A major negative impact would be expected on the administrative burden of inland skippers as a result of making voyage plan reports mandatory. This would require accurate estimation of the arrival time of inland shippers at locks and bridges *en route*.

First of all, it is important to indicate that the electronic cargo report (ERINOT) is different from the electronic voyage plan (ERIVORY). The ERINOT report contains information on origin and destination of the voyage, the amount and type of cargo and the number of persons on board. This can optionally include an ETA at destination. An ERIVORY message is similar, but much more comprehensive. Here, the barge master should specify important route points. The box below describes the operations:

How the information exchange between the voyage planner onboard and the Route Planner (via the message service and Traffic Information Services (TIS)) works:

[1] and [2]: A ship sends both an Erinot and an Erivoy message (departure-destination) before departure. The ship monitors its own progress and makes adjustments if necessary. If a relevant deviation from the schedule indicated in the Erivoy message occurs, the skipper can update the Erivoy message.

[3] When approaching a lock, the arrival of the vessel is coordinated with the lock cycle. The RIS authority sends a message requesting to be at the lock at a certain time. If necessary, the skipper can adjust his speed. This message can be sent one to one and a half hours in advance.

[4] When the vessel has approached sufficiently and the lock chamber planning is final, the skipper receives a message via TIS with lock chamber, lock chamber layout and entry order.

[5] After passage, in case of relevant deviations, the skipper can update again via Erivoy update.

[6] Special circumstances that strongly influence the voyage can be reported to the skipper via the INFO message. If he adjusts his sailing plan, he can report this via Erivoy (as in 2).

[7] Arriving at the destination, the skipper sends Erivoy the message 'end of voyage'.

The importance of voyage planning

Voyage preparation is an important element for inland navigation operators. This is illustrated by Directive (EU) 2017/2397 of the European Parliament and of the Council of 12 December 2017 on the recognition of professional qualifications in inland navigation. The Annex of this Directive defines the competences which captains in inland navigation have to meet. One of those competences relates to voyage preparation: "The skipper must be able to plan and navigate a voyage on inland waterways, which includes being able to choose the most logical, economical and environmentally friendly navigational route to reach the loading and unloading destination, taking into account the applicable navigation regulations and the agreed set of rules applicable in inland navigation". To emphasise the importance of good voyage planning, it also forms part of the practical exam for inland skippers¹⁶⁸.

The importance of adequate trip preparation is emphasised even more when the same Directive looks at the regulations for navigating waterways of a maritime nature or inland waterways with specific risks.

- In the case of maritime waterways, an inland skipper should be able to work with up-to-date maps, notices to skippers and other publications related to this type of waterway and deal with tidal data, currents, periods and cycles, the timing of currents and tides and variations in an estuary
- In the case of waterways with specific risks, an inland skipper should have additional competences. These include knowledge of current patterns and speeds, hydro morphological characteristics of the inland waterway or local traffic regulations

During exams for inland skippers, one and a half hours are allowed for trip preparation. This time can be seen as a proxy where all required competences come together. This includes taking note of all nautical information needed for a safe voyage as well as knowledge for the loading of the vessel and other requirements. Adequate voyage preparation is also tested in practice by certain sub-sectors. See, for example, the box below from Oil Companies International Marine Forum (OCIMF (2020))¹⁶⁹:

¹⁶⁸ https://www.inlandwaterwaytransport.eu/wp-content/uploads/Beroepskwalificaties-in-de-binnenvaart-brochure_NL.pdf

¹⁶⁹ <https://www.ocimf.org/document-library/549-master-biq5-ebis9-v5001-dutch/file>

Box.3: Example of practical exam for inland skippers

Ask about the trip preparation of the current and/or previous trip. This trip preparation should be carried out as a risk analysis and the crew should be familiar with the restrictions included. This does not mean a pure checklist with only yes/no answers but must include all elements that may pose a risk during the voyage, some of which are listed below.

- the least expected water level
- the maximum expected water level (consider the variable clearance and any navigation bans and restrictions)
- the UKC (UKC: Under keel clearance = is the space between the ship's bottom and the fairway bottom) also known as the minimum safety margin
- the creep height
- the expected navigational restrictions during the voyage (notices to skippers)
- the VHF channels to be used in the different block areas
- if applicable the tides

In practice, however, the time required for travel preparation varies widely. Some voyages require more preparation than others. The degree of complexity of the route to be sailed, the number of RIS authorities on the route to be sailed and the degree of familiarity of the vessel with the route to be taken are decisive in this respect. The following, non-exhaustive, maxims can be established:

- Journeys within the territory of one RIS authority are thereby easier than journeys across the territory of several authorities
- Inland skippers who sail under a fixed contract on few routes have an easier time than those who operate on the free market and therefore navigate different routes each time
- Sailing on rivers is more complex than sailing on canals. Free-flowing rivers (Rhine, Danube, Elbe) have problems with both low water levels and high-water levels, canalised rivers such as the Meuse, Moselle and Main only have concerns at water levels higher than the barrage level
- Tidal water is a tricky aspect, especially if the waterway cannot be crossed during low tide. On the Western Scheldt, for instance, the issues are high current velocity at both ebb and flood and (un)availability of side channels. Maritime fairways such as the Ems and Hunte in Germany, the fairway between the IJsselmeer and Harlingen Seaport (Netherlands) and the Zeeschelde and Nete (Belgium) are unnavigable for loaded ships during low tide
- Waterways with many moveable bridges are complex because underpasses, operating times and how to request operation are complex

To give examples of travel planning in practice, see the boxes below:

Box.4: Example 1: A journey from Rotterdam to Basel (about 800 kilometres, 4 days) with a large motor freighter loaded with containers

- There should be knowledge of the least depth en route. For this purpose, the skipper should consult the national RIS portals of the Netherlands (www.vaarweginformatie.nl), of Germany (www.elwis.de), of France and Switzerland (www.e-ris.eu). Current and forecast water levels should be retrieved and then converted to sailing depths. The vessel's draught should be adjusted accordingly.
- There should be knowledge of the vertical clearance in relation to the reference value of all bridges. Which bridge gives the greatest restrictions at the expected water levels? The loading of the vessel should be adjusted accordingly.
- All restrictions and obstructions en route should be noted.
- The operating times of the locks on the Upper Rhine should be noted.

Box.5: Example 2: A ship sailing from Rotterdam to Maastricht (approx. 250 kilometres, 2 days)

- The expected water levels and Least Sounded Depths on the Waal should be noted at www.vaarweginformatie.nl. Based on the information, the skipper weighs up the route via the Waal and the Maas-Waal Canal and the Maas, the route entirely via the Maas or the route via Antwerp, the Albert Canal and the lock at Ternaaien.
- When the route via the Waal is not possible due to draught restrictions, people consider the alternative route via the East-West branch of the Meuse. Here, waiting times at the Lith and Grave lock complexes are considered.
- If waiting times there are too long, people consider a route via the Albert Canal. Relevant information on the situation on the Flemish waterway network is consulted via www.visuris.be; relevant information on the (short) route on Walloon territory via www.voies-hydrauliques.wallonie.be.
- The vertical clearance of bridges on the Waal, Meuse and Albert Canal should be noted. The underpass heights should be converted to the maximum height of the vessel on the basis of expected water levels.
- Knowledge should be taken of the tidal currents in the Rijnmond, for example via www.waterberichtgeving.rws.nl.
- All restrictions and obstructions *en route* should be noted.
- The operating times of *locks en route* should be noted.

5.5 Non-economic impacts

Impacts on jobs and skills

It has not been possible to identify quantitative information that would allow a more detailed analysis in terms of jobs and skills. As only a qualitative approach is followed.

A rapid increased in terms of digital information may result in a decline in the abilities of inland skippers to deal with these. Complaints from the industry in this regard are already known, mostly coming from the slightly older generation of inland skippers. The comment below is from the 2009 weekly *Schuttevaer*, which first mentioned the possibilities of “autonomous shipping”.

"If the costs for such a system are still a bit better than expected, I think it will quickly become a success. There are quite a few shortcomings to automatic shipping but from what I read; it is being worked on adequately. The only thing is that a lot of knowledge will again be lost. You already often see the difference between a "tresco" skipper and a "traditional" skipper, and especially with high and low tides, you notice that a lot of fairway knowledge is lost."

The more digital information is made available to shipping and the more advanced the technology becomes; the less knowledge skippers need to have themselves. On free-flowing rivers, in particular, it is becoming clear that these skills are in decline. At the same time, virtually all kilometres are still sailed by hand. Track-pilots can currently only be used on long stretches of waterway. Encounters with other ships or passing ships still have to be done manually. For now, the technology has not yet reached the point where such actions can be carried out fully autonomously. Knowledge and experience in the inland navigation sector is actually stimulated with the introduction of Directive 2017/2397 and the mandatory practical examination (also on the simulator). Inland skippers who obtain their diploma without ever having been at the helm, will no longer be seen in the sector.

However, there is a risk when Smart Shipping takes off and most ships are, hypothetically, remotely piloted. The question here is whether remote sailing time should be valued as real sailing time. Moreover, the question is whether knowledge of specific situations on rivers also apply when this knowledge is gained by remote control. These are questions that will need to be answered.

Many measures do not interfere with the skipper's skills but offer the skipper more accurate information to make decisions during navigation. In doing so, the proposed measures offer information that is currently hard or impossible to obtain. These include reference data in various inland ports, information on the current bottom location of the fairway and information on current clearance heights. The table below qualitatively describes the effect of the measures on skills.

Innovation effects

River Information Services can be seen as one of the prerequisites for the adoption of Smart Shipping systems by inland navigation. Smart Shipping systems are aids to inland navigation in sailing tasks. The impact of these can range from track pilots (already

prevalent) to remote control navigation or even autonomous vessels. The Central Rhine Navigation Commission (2018) published a list of automation levels in inland navigation¹⁷⁰ and the role of crew on board or remotely, see Figure 57. This decision aims to further define the automation levels of the complex systems used in inland navigation. The definition provides a structured picture that allows a global approach to automated navigation and, at a later stage, differentiated and based on a common understanding, to assess the need for regulatory measures.

Figure 57: List of automation levels in inland navigation

	Niveau	Omschrijving	Besturing (manoeuvres, voortstuwijng, stuurhuis,...)	Monitoring en reactie op de vaaromgeving	Terugval- maatregelen voor de dynamische vaartaken	Afstandsbediening
De schipper verricht alle dynamische vaartaken of een gedeelte van deze taken	0	Niet geautomatiseerd alle aspecten van de dynamische vaartaken worden te allen tijde verricht door de schipper zelf, ook al worden deze ondersteund door waarschuwings- of interventiesystemen <i>Bv. vaart met behulp van radar</i>				Nee
	1	Ondersteuning bij de besturing de toepassing van een <u>stuurautomaat</u> binnen een specifieke context met gebruik van bepaalde informatie over de vaaromgeving waarbij ervan uitgegaan wordt dat de schipper zelf alle overige aspecten van de dynamische vaartaken verricht <i>Bv. autopiloot</i> <i>Bv. trackpilot (koerssysteem voor binnenschepen langs vooraf vastgelegde geleidelijnen)</i>				
	2	Gedeeltelijk geautomatiseerd de toepassing van een geautomatiseerd besturingsysteem voor <u>zowel de besturing als de voortstuwijng</u> binnen een specifieke context met gebruik van bepaalde informatie over de vaaromgeving waarbij ervan uitgegaan wordt dat de schipper zelf alle overige aspecten van de dynamische vaartaken verricht				Al naar gelang de toepassing binnen een specifieke context is afstandsbediening mogelijk (besturing van het schip, monitoring van en reactie op de vaaromgeving of terugvalmaatregelen). Dit kan gevolgen hebben voor de bemanningsvereisten (aantal of kwalificatie).
Het systeem verricht alle dynamische vaartaken (indien ingeschakeld)	3	Geautomatiseerd onder voorwaarden de <u>ononderbroken</u> toepassing van een geautomatiseerd besturingsysteem voor <u>alle</u> dynamische vaartaken binnen een specifieke context, <u>met inbegrip van het vermijden van aanvaringen</u> , waarbij ervan uitgegaan wordt dat de schipper zelf ontvankelijk is voor verzoeken om in te grijpen en voor systeemstoringen en adequaat hierop reageert				
	4	Hoog geautomatiseerd de ononderbroken toepassing van een geautomatiseerd besturingsysteem voor <u>alle</u> dynamische vaartaken binnen een specifieke context, <u>met inbegrip van terugvalmaatregelen, zonder ervan uit te gaan dat een schipper zelf zal reageren op een verzoek om in te grijpen</u> ⁹ <i>Bv. een schip dat tussen twee sluizen een kanaal bevaart (omgeving is goed gekend), maar het geautomatiseerd besturingsysteem is niet zodanig dat daarmee de sluizen gepasseerd kunnen worden (daarvoor is de interventie van een persoon vereist)</i>				
	5	Autonoom = Volledig geautomatiseerd de ononderbroken en <u>onvoorwaardelijke</u> toepassing van een geautomatiseerd besturingsysteem voor <u>alle</u> dynamische vaartaken, met inbegrip van terugvalmaatregelen, zonder ervan uit te gaan dat de schipper zelf zal reageren op een verzoek om in te grijpen				

Source: CCNR (2018)

Fully automated, possibly unmanned vessels are in the future, but it is difficult to predict at this stage when they will represent a significant part of the European IWT fleet. An important barrier that hampers their uptake is related to the IWT-regulation which does not currently allow the commercial use of automated inland vessels, nor are there dedicated automation standards available. In this respect, while RIS can play a role in supporting automation, it is not the only element, and other initiatives need to take place in parallel.

Based on the fact that the availability of high-quality data is an essential prerequisite for the use automated inland vessels, the uptake of smart shipping is related to the policy measures guaranteeing to create high-level quality data. The most relevant policy measure is PM4, along with PM6, PM9 and PM10, as they are related to providing high-quality data and developing new standards. Given the uncertainty of introduction of automated vessels and the lack of quantified information, no further analysis of the impact of RIS on automation is estimated.

¹⁷⁰ Decision 2018-II-16

Relationship between Smart Shipping and RIS initiatives

Several studies indicate a strong relationship between data offered to the inland navigation sector under River Information Services and the adoption of Smart Shipping technologies in inland navigation. Platina 3 (2022) remarks that *"it has to be noted that when adding automated vessels into the system of the traffic, a mixed environment will be created. In inland navigation it is hardly possible that (fully) autonomous vessels will use different route trajectories, different locks, or bridge openings etc. than human-driven vessels (such as it may be possible in road transport with physically separated lanes). In this sense, rules and regulations for the mixed traffic environment will need to top up the currently existing ones, sustaining the already very high safety and efficiency levels of IWT"*.

There is an important role for data flows and information standards such as in River Information Services. It states that *"the availability of the high-quality (accurate and complete) data is essential prerequisite for operation of (fully) autonomous and remotely controlled vessels. Possibility to access and retrieve data via machine-readable interfaces and from single point of access provides an added value necessary for voyage and route plans and enables their updates at any time."*

A summary of key requirements beyond the current RIS guideline are:

- Machine-readable data exchange (system to system communication)
- Increased importance of data quality – authorities
- Data, formats and protocols standardisation and harmonisation
- A classification on the level of Readiness of waterway network for automation
- Digitalised traffic rules

Apart from this, new data are needed. Amongst others, these include:

- The latest updates of navigation charts and other nautical information necessary for the intended voyage should be available together with accurate, complete and real-time information on navigational restrictions (both permanent and temporary), water levels, bridge clearances, and weather and traffic (both actual information and forecasts)
- Availability of static and dynamic information about infrastructure, such as data on waterway network, dimensions, (virtual) buoys, sailing speed (maximum speed), bridges, locks and their operating times, IENC [DIWA, p.23] with 3D bathymetric charts (at least) for critical bottlenecks, and other navigational limitations and hazards
- Availability of real time traffic information and forecasts. According to the indication of vessel operators [DINA, p.45], the current lack of real-time information on traffic conditions limits the possibilities for adaptations of voyage plans. The availability and sharing of real time traffic information by the competent authorities, such as delays at locks or bridges, allocation of berths, updates of terminal calls or other traffic conditions, will enable a real-time update of voyage plans
- Information about critical sections and critical infrastructure objects. Prior to voyage planning and loading of autonomous vessels, information on actual bridge clearances (and forecasts) is needed for a safe passage of critical bridges

Moreover, future requirements with regard to Inland Electronic Navigational Charts (IENC) are to:

- Increase the accuracy, completeness (e.g. bridge contour lines in ECDIS map [PIANC & DIWA, p.28]) and reliability requirements for the services (e.g. production of IENCs)
- Regularly update the bIENC overlay (bathymetric riverbed information), visualised as depth contour lines, based on riverbed characteristics
- Further to the semi-static digital map information, **provide** accurate, complete and up-to-date dynamic digital information about the network will be required with the increased automation, connectivity and cooperation in inland shipping. This includes that dynamic waterway signs and marking and dynamic information about incidents, weather warnings, or water level and discharge information
- To enable safe navigation, especially on free-flowing rivers, and to avoid groundings or collisions with bridges, the provision of accurate, complete and up-to-date information, in particular shallow sections (including least fairway depth) or bridge clearance, is essential. Additional sensors for (the most) critical objects, like bridges, could be beneficial (not only) for autonomous navigation. Therefore, at least critical bridges could be equipped with additional sensors (e.g. for actual bridge clearance) or calculations based on the corresponding water levels relevant for bridges. Provision of information on shallow sections (critical sections), including (actual/predictions) water levels for critical sections, (actual/predictions) least sounded depth information, depth profile of the fairway in the critical section
- Traffic information from infrastructure operators: as shipboard automation increases, so does the need for external information to enable safe navigation and to provide redundancy. The particular challenge is the quality of data, thus provision of accurate, complete and up-to-date data on the following topics: continuous traffic situation overview and density, passage durations and waiting times at locks and bridges, provision of recommended tracks on the fairway, boundary lines of manoeuvring corridor and obstacle detection
- Information from **infrastructure** such as: dimensions of berth place, availability of several (automated) berthing systems and facilities, position of bollards, allowable force on bollards, bollards equipment, anchoring places, anchoring allowed/prohibited, planning of other vessels already moored or to be expected, docking/ mooring/ anchoring place allocation
- Currently, there are no agreed communication standards applicable in inland navigation (in comparison with C-ITS on the road). The input received for the DIWA report indicated that inland navigation stakeholders expect authorities to take the lead in formulating these communications standards for vessel-to-vessel and vessel-to-shore communication

Moreover, Panteia and Ecorys (2021) indicate some data requirements to increase the uptake of smart shipping concepts:

- Efforts should be made to **improve information provision** with the aim of reliable, secure, complete, accurate data with the objective of contributing to smart shipping
- **Further digitisation of objects** by equipping infrastructure with sensors to share information that is currently not available (in the desired quality or form). This includes current water levels at movable bridges, so that inland navigation companies can accurately estimate the current headway with smart applications.

Additional measuring points regarding water depths on free-flowing rivers and a better understanding of the underwater profiles of waterways are also needed

- **Accurate/up-to-date fairway maps and sufficient mobile internet coverage** on the waterways. The current Inland-ECDIS charts are too coarse in nature to be used in highly automated navigation. In fact, maps that also show bottom location up to date and accurately, are needed. Extensively automated or even autonomous sailing vessels need to be able to look ahead and anticipate meeting other vessels. To this end, it is necessary to have knowledge of the locations where these ships can be passed. Especially, on the underlying waterway network, with low traffic volumes, this is not always possible. Waterways on the underlying waterway network are usually built in a tight profile and sometimes even in a single-lane profile. This means that passing should be done with caution
- **Information opening up nationwide**, so that from one information source the necessary information on water levels on central and decentralised waterways, operating times of structures, and similar data, can be obtained
- **Instruments that can take over the vessel traffic signal function and transmit it to inland navigation.** This is necessary, to give (largely) autonomous vessels the insight that they can safely enter a lock

An update of the RIS directive is not the only thing needed to get Smart Shipping off the ground. Another important element is achieving uniform European crew regulations for inland navigation, including regulations on sailing and rest times. In a proposal by the social partners, the extent to which inland vessels are equipped with technological systems that facilitate sailing is included in the calculation of minimum crew requirements. Also given the huge number of initiatives and regulations to be taken in various fields by Pan-European institutions to enable this innovation, it is not possible to quantify the exact contribution of the RIS directive. What is clear, however, is that measures that contribute to Smart Shipping have a very positive impact.

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