



D6.3 - Food Safety Risk Assessment Community-Centred Assessment Plan



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RESPONSIBLE AUTHOR	Matthias Filter (BfR)

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PROJECT WEBSITE	plus.aginfra.eu
COORDINATOR	Nikos Manouselis
ADDRESS	110 Pentelis Str., Marousi GR15126, Greece
REPLY TO	nikosm@agroknow.com
PHONE	+30 210 6897 905
EU PROJECT OFFICER	Mrs. Georgia Tzenou
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RESPONSIBLE AUTHOR	Matthias Filter (BfR)
REPLY TO	Matthias.filter@bfr.bund.de
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REVIEWER	Antonis Koukourikos (Agroknow)

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PARTICIPANTS		CONTACT
Agro-Know IKE (Agroknow, Greece)		Nikos Manouselis Email: nikosm@agroknow.com
Stichting Wageningen Research (DLO, The Netherlands)		Rob Lokers Email: rob.lokers@wur.nl
Institut National de la Recherche Agronomique (INRA, France)		Pascal Neveu Email: pascal.neveu@inra.fr
Bundesinstitut für Risikobewertung (BfR, Germany)		Matthias Filter Email: matthias.filter@bfr.bund.de
Consiglio Nazionale Delle Ricerche (CNR, Italy)		Leonardo Candela Email: leonardo.candela@isti.cnr.it
University of Athens (UoA, Greece)		George Kakaletis Email: gkakas@di.uoa.gr
Stichting EGI (EGI.eu, The Netherlands)		Tiziana Ferrari Email: tiziana.ferrari@egi.eu
Pensoft Publishers Ltd (PENSOFT, Bulgaria)		Lyubomir Penev Email: penev@pensoft.net

ACRONYMS LIST

VRE	Virtual Research Environment
WP	Workpackages
QMRA	Quantitative Microbial Risk Assessment
CV	Controlled Vocabulary
GUI	Graphical User Interface
API	Application Programming Interface
RSS	Rich Site Summary
DOI	Digital Object Identifier
FSK-ML	Food Safety Knowledge Markup Language
FSKX files	Food Safety Knowledge Exchange File
OS	Operating System

EXECUTIVE SUMMARY

This report outlines the plan for assessing the effectiveness of the developed AGINFRA+ components that could be deployed into the different versions of the food safety risk assessment pilot VREs. For this the report details how and when pilots will be generated and when assessment activities will be undertaken. It will also detail how assessment will be performed and what kind of feedback can be expected from the Food Safety Risk Assessment community.

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1 INTRODUCTION

For the area of Food Safety Risk Assessment, there are two different use cases that will allow to assess newly developed AGINFRA+ resources in the context of specific pilot VREs.

In the first use case, WP6 aims to address the needs of the “Emerging risk identification” (DEMETER) community. In this community, the early identification of emerging risks in the food (and feed) chain is the main objective. This task is an important element in the strategy of all responsible European governmental agencies to protect European consumers through timely and effective preventive measures. The use of new data mining and data science solutions (digital technologies) is considered as crucial to achieve this objective in the future. Specifically, the identification of emerging food or feed safety issues at an early stage is of high importance. Therefore, this use case will illustrate how a pilot VRE can facilitate the exchange of knowledge on emerging risk identification between the responsible risk assessors in governmental agencies and how KNIME-based data mining technologies can support the exchange of this kind of knowledge. Furthermore, it is planned to illustrate how the developed solutions support open science and FAIR data principles.

The second use case is directed to support data-intensive applications in the area of food safety modelling. This includes the extension of the community’s capabilities to share mathematical models, to create simulation results and to deploy generated data processing workflows as web-based services. Through the envisaged pilot VREs risk assessors and modellers will be able to share their knowledge (data, mathematical model, simulation results) in a transparent way. Specifically, it will be demonstrated how a community-driven food safety model repository, which contain mathematical models from the area of predictive microbial modelling and quantitative microbial risk assessment (QMRA), can be supported established through new AGINFRA+ resources. Finally, the use case will also illustrate the potential of the pilot VRE on providing computational resources in computational intensive risk assessment simulations.

An important element for assessing newly developed AGINFRA+ resources is an active engagement of members of the two communities into the two domain-specific pilot VREs. For this WP6 will actively promote the concept and features of VREs in related national and international research projects.

2 ASSESMENT METHODOLOGY

In the context of the Food Safety Risk Assessment area, the assessment of newly developed AGINFRA+ resources and components will be accomplished through demonstrating that use-case tailored pilot VREs (pilots) support the central theme of both communities which is “efficient knowledge exchange”. This theme is closely linked to the indicator “**Openness and FAIRness**” that will be the most important indicator of the planned assessment activities. Further the indicator “**Usefulness**”, “**Learning Curve**”, “**Performance, Scalability**” and the “**Uptake potential**” will be assessed.

Beside showcasing new technical resources developed for the gCube VRE platform, the assessment will also cover newly generated or enhanced external resources like:

- The harmonized standard for representation of models and data (extending PMF-ML) => Food Safety Knowledge Markup Language (FSK-ML)
- The open-source software tool (FSK-Lab) which is relevant to the Food Safety Risk Assessment community and that now supports the new harmonized information exchange standard (FSK-ML). Specifically, the newly development import and export functions as well as new JavaScript-based nodes for metadata editing and simulation parameter specification will be demonstrated.
- The new web-based services deployed on BfR’s KNIME server infrastructure that facilitate computational expensive simulation and complex knowledge visualization tasks.

The assessment therefore also includes evaluation of new software features generated during the AGINFRA+ project for tools within the FoodRisk-Labs’ suite of tools.

2.1 INTERACTION WITH COMMUNITIES

A core aspect in the assessment is the interaction with the targeted communities. The pilot VREs generated within AGINFRA+ project aim at providing support for relevant members in the use case specific research domains. This will be demonstrated to the corresponding researchers through promoting VREs in two ongoing research projects, specifically the RAKIP and DEMETER project. In this way, close interaction and synergies will be generated between all three projects. Therefore the process of engaging users to the pilot VREs started immediately with the first pilot development work carried out by WP6 in month 9. This engagement process will be facilitated by the fact, that each use case community has an intrinsic interest in using basic VRE features for their project work. Nevertheless the engagement process of additional community members will continue until the end of the AGINFRA+ project.

An important factor that contribute to this user engagement is the fact that BfR communicates actively in workshops as well as in national and international conferences on the VRE pilots. Upcoming events are the meetings of the EREN members, the Global KNIME summit, the FoodMicro 2018 and the ICPMF11 2019 conferences. The other involved AGINFRA+ project partners will communicate new technical AGINFRA+ resources and results via their specific dissemination channels.

It is planned to involve more than 30 persons from each of the two research communities in the assessment efforts.

2.2 PILOTS TRIALS

The pilot VREs will be generated by WP6 on the basis of technical resources provided by the technical WPs. This means significant customization and development efforts will be spend by WP6 to make existing and newly developed technical features from WP2-4 usable for the specific community.

The following pilot VRE versions will be generated:

First pilot VRE versions (Intermediate phase, until M18)

The first pilot VRE versions will integrate existing and newly developed VRE components made available by technical WPs for the food-safety use cases until month 12. It will also demonstrate how to integrate services that are developed and hosted for external resources like BfR's KNIME Server. Through the early integration of community members into the pilot VRE the members of both food safety communities get the chance to "familiarize" with basic functionalities of VRE and to follow the progress of pilot VRE development. As outlined in the DoW the assessments of the first pilot VRE will be restricted in terms of scale and complexity and are used to provide data on early AGINFRA components (and to refine the pilot VREs into their second and third versions).

Second pilot VRE versions (summative phase, M22-M30)

This pilot will be based on technical features provided by the technical WPs until month 24. Customization to the needs of the specific WP6 communities will be performed by WP6 from month 22 to month 30. Depending on the maturity and the coverage of new VREs features developed by the technical WPs, these pilot VREs will allow to assess different indicators relevant for the overarching project objective. However, the main objective of the second pilot VREs are to validate the prototype of the overall AGINFRA ecosystem and produce the respective evaluation reports against the Food Safety use cases (D6.4).

Third pilot VRE versions (summative phase, M30-M33)

This pilot VRE will be based on improved technical features provided by the technical WPs after month 24 and further customization to specific community needs performed by WP6 until month 33. This pilot will be integrated into the final version of AGINFRA (M33) will be assessed in the final evaluation and assessment report (M33).

2.3 PILOTS EVALUATION

The evaluation of the pilot VREs will be organized by BfR and performed along a set of assessment indicators and evaluation questions that are targeted to the specifics of the WP6 community. Due to the difference in the scale, setup and number of involved evaluators in each of the piloting phases (as described in the previous section), only the indicators fitting the specific pilot VRE version will be evaluated. Moreover, the way in which indicators and metrics will be measured will differ over the three evaluations. This is inevitable, because of the type and complexity of the components and workflows to be evaluated as well as because of the different profiles of the evaluators that are involved in every single assessment.

The assessment of the pilot VREs for the food safety communities has a broad range of objectives, which again leads to a broad set of assessment indicators. While, for some indicators, it is expected to be feasible to perform quantitative evaluations, the character of some of the other indicators, and of the group of evaluators involved, will result in qualitative evaluations.

To support the overall AGINFRA+ evaluation process, we will apply the following harmonized evaluation methods:

- *Quantitative benchmarking*: for a limited set of indicators, quantitative measurements or scores can be applied, for example for the indicator "performance" by measuring "computation time" in a "conventional" modelling environment compared to a VRE environment.

- *Qualitative scoring*: Quite some indicators will not be suitable for quantitative evaluation. In these cases, at least a qualitative evaluation, for example though ordinal scoring, will be developed. We plan in these cases also to add the option to provide an additional explanation in the form of a short expert review. This will allow to get better insight in the motivation of the individual reviewer.
- *Expert review*: Both in the first and second phase of the piloting scheme, where more experienced evaluators will be involved, a set of more complex, technical and usability indicators will be included in the evaluations. For those indicators that cannot be easily benchmarked or where quantitative assessment alone does not provide sufficient insight, an expert review procedure will be developed. The expert review will allow experts to (1) explain the motivation for their quantitative scoring of indicators, (2) assess indicators, using their past experiences with non-VRE environments and (3) allow evaluators to give their opinion on the pilot VREs through an interview with open questions after an evaluation session.
- *End-user survey*: The broader trials in the third phase of the piloting scheme, the associated character and heterogeneity of the group of evaluators, the end-user-oriented setup of the trial and the limited time available in events will require a targeted approach. The indicators that are specifically evaluated by this group will be assessed through an end-user survey that can be completed in a relatively short time, also by less experienced evaluators. The format will be an on-line survey.

For all aforementioned evaluation methods, apart from the “Expert review”, BfR will use on-line feedback tools to collect end-user feedback. The “Expert review” will be conducted as a personal interview with the experts.

The following table summarizes the indicators selected for the WP6 pilot VREs. It also indicates the method of assessment, the pilot VRE versions and the specific questions used to assess each indicator.

Table 1: Evaluation indicators for food-safety pilot VREs

Indicator of the pilot VRE	Rationale and evaluation questions	Assessment method	Pilot VRE version
Usefulness	The pilot VRE should support researchers to perform their work “in the cloud” in a collaborative environment that allows co-development by remote researcher and research teams and that offers performance and scalability in performing Questions: <i>How do you assess the usefulness of the pilot VRE with regard to the following aspects:</i> <ul style="list-style-type: none"> - Collaboration and communication - Data analytics - Data visualisation 	Expert review	1
		Qualitative scoring	2
		End-user survey	3

	<p><i>Do you think that the pilot VRE can help you to perform your work “in the cloud” and support co-development by remote researcher and research teams?</i></p> <p><i>Which identified and documented (see D6.1) as a community need VRE features were provided in the VREs?</i></p>		
Learning Curve	<p>How much time is needed to learn new pilot VRE functionalities and to master underlying technology and functionality, before the pilot VRE to be used?</p> <p>Questions:</p> <p><i>How do you estimate the effort to learn how to execute a data or knowledge visualization procedure or model simulation feature provided in the pilot VRE?</i></p> <p><i>How do you estimate the effort to use the pilot VRE for your own research, e.g. to develop, run and publish your model/ data analysis pipeline with the pilot VRE?</i></p>	<p>Qualitative scoring</p> <p>End-user survey</p>	<p>1, 2</p> <p>3</p>
Performance, Scalability	<p>The pilot should support collaborative research in such a way that performance is (at least) comparable with “traditional environments”. The pilot solution should also offer scalability, meaning that the available resources (for computing, storage etc.) should be able to adapt to the amount and size of the research jobs, the number of concurrent users etc.</p> <p>Questions:</p> <p><i>How do you rate the performance of the pilot VRE compared to the platform(s) you are used to work with?</i></p> <p><i>How do you rate the scalability of the pilot VRE?</i></p>	<p>Qualitative scoring</p> <p>End-user survey</p>	<p>2</p> <p>3</p>
Openness and FAIRness	<p>Openness is an important asset of any environment related to the European Open Science Cloud. This means that it should be easy to add new data and analytics to the pilot VRE and to publish and share resulting workflows, components, and data with other researchers.</p>	<p>Expert review</p> <p>Qualitative scoring</p> <p>End-user survey</p>	<p>1,</p> <p>2</p> <p>3</p>

	<p>This relates to how the pilot VREs support in making research data and algorithms FAIR (Findable, Accessible, Interoperable, Reusable).</p> <p>Questions:</p> <p><i>How open do you think the pilot and its tools are from the following perspectives?</i></p> <ul style="list-style-type: none"> - <i>Ease of finding and accessing and reusing datasets</i> - <i>Ease of finding and assessing and reusing analytics and models</i> - <i>Ease of registering and sharing datasets</i> - <i>Ease of registering and sharing analytics and models</i> 		
Uptake potential	<p>This indicator will give us feedback on how likely it is that the person assessing the pilot would also be willing to use it after the end of the project.</p> <p>Questions:</p> <p><i>What is the likelihood that you would use a system as the one demonstrated in the pilot in the future for your work?</i></p> <p><i>How many activities (like workshops, talks, presentations) were performed to promote the general AGINFRA+ concept within the Food Safety Risk Assessment communities?</i></p>	<p>Quantitative benchmarking</p> <p>Qualitative scoring</p> <p>End-user survey</p>	<p>1</p> <p>2</p> <p>3</p>

In general, the evaluation questions will be defined in such a way that the evaluator will at least provide a qualitative or quantitative rating. Besides, in relevant cases, additional comments will be requested to explain the scoring of the evaluation questions and the indicator in general.

A typical format would be as in the following example evaluation question:

Indicator - <Indicator name>

< short explanation / rationale of the indicator from the table above >

<Evaluation question 1>

1- insufficient	2	3- sufficient	4	5 - very good	Not applicable

Further explanation and comments on question 1:

.....

<Evaluation question 2>

1 - very low	2	3 - moderate	4	5 - very high	Not applicable

Further explanation and comments on question 2:

3 USE CASE 1 ASSESSMENT

USE CASE 1: DETERMINATION AND METRICS OF EMERGING RISK - DEMETER

3.1 TARGET USERS

Risk Assessor / Data Scientist:

The use case will illustrate how the pilot VRE can facilitate the work of risk assessors/ data scientists in the domain of emerging risk identification. It is estimated that this community currently consists of around 20-30 persons in Europe as the area is a highly specialized research topic that requires a very interdisciplinary skill-set. A key role as information hub and focal point plays EFSA, the European Food Safety Agency. EFSA operates a so called “multifaceted emerging risks identification system” which is triggered by a signal of an emerging issue from the EFSA Stakeholder Discussion group on Emerging Risks (StaDG-ER) or the Emerging Risk Exchange Network (EREN). Therefore the use case primarily target members of the DEMETER project and persons involved in EFSA’s emerging risk identification activities.

3.2 ASSESSMENT OBJECTIVES

The objective for the assessment of this pilot VRE is to answer the question, if the new web-based resource for the Emerging Risk Identification community (DEMETER VRE) has the potential to serve as an Open Science resource in the future. To accomplish this, the generated resource has to go beyond an infrastructure for sharing text documents as it is the currently applied practice. Specifically, it will be assessed if the generated pilots (second and third version) can be used to share information, data and data-analysis pipelines developed by different stakeholders, e.g. members of the EREN network. Furthermore, it will be assessed if new opportunities to visualize results of calculations performed by domain-specific data mining and data analysis operations can be provided.

3.3 ASSESSMENT INDICATORS

The assessment of the first pilot VRE version was performed as an agile in-house hands-on testing process where 3 Data Scientists participated. The participants assessed the “**Usefulness**” by scoring which of the end-user needs identified in the Formative phase (D6.1 - see chapter 2.1.4, 2.1.5, 2.1.6 and 2.1.7) were already available. The assessment was done on the following granularity: available, not available, partly available. The “**Uptake potential**” was assessed by measuring how many dissemination activities were carried out to promote the idea of the RAKIP VRE pilot (number of talks, number of workshops). The “**Learning Curve**” was assessed by expert scoring on “*How do you estimate the effort to learn how to execute a data extraction KNIME workflow provided in the pilot VRE?*” The “**Openness and FAIRness**” was assessed via an expert review.

The second pilot VRE version will be assessed as a combined training and evaluation workshop. The evaluation will cover all indicators listed under 2.3.2. The participants of the workshop will be asked to vote on the following questions. In addition, this workshop will support the decision, which of the features provided by the technical WPs are mature enough to be included in the final third pilot VRE version.

Indicator of the pilot VRE	Rationale and evaluation questions	Assessment method
Usefulness	<p><i>How do you assess the usefulness of the pilot VRE with regard to the following aspects:</i></p> <ul style="list-style-type: none"> - <i>Collaboration and communication</i> - <i>Data analytics</i> - <i>Data visualisation</i> <p><i>Do you think that the pilot VRE can help to perform your work “in the cloud” and support co-development by remote researcher and research teams?</i></p>	<p>Qualitative scoring</p> <p>Qualitative scoring</p>
Learning Curve	<p><i>How do you estimate the effort to learn how to execute a data or knowledge visualization procedure or model simulation feature provided in the pilot VRE?</i></p> <p><i>How do you estimate the effort to use the pilot VRE to share your own emerging risk data analysis pipeline with the pilot VRE?</i></p>	<p>Qualitative scoring</p> <p>Qualitative scoring</p>
Performance, Scalability	<i>How do you rate the performance of the pilot VRE compared to the platform(s) you are used to work with?</i>	Qualitative scoring
Openness and FAIRness	<p><i>How open do you think the pilot and its tools are from the following perspectives?</i></p> <ul style="list-style-type: none"> - <i>Ease of finding and accessing and reusing datasets</i> - <i>Ease of finding and assessing and reusing analytics and models</i> - <i>Ease of registering and sharing datasets</i> - <i>Ease of registering and sharing analytics and models</i> 	Qualitative scoring
Uptake potential	<i>What is the likelihood that you would use a system as the one demonstrated in the pilot VRE in the future for your work?</i>	Qualitative scoring

The third pilot VRE version will be assessed as a combined demonstration and evaluation workshop. The evaluation will cover all indicators listed under 2.3.2. The participants of the workshop will be asked to vote on the following questions:

Indicator of the pilot VRE	Rationale and evaluation questions	Assessment method
Usefulness	<i>How do you assess the usefulness of the pilot VRE with regard to the following aspects:</i> <ul style="list-style-type: none"> - <i>Collaboration and communication</i> - <i>Data analytics</i> - <i>Data visualisation?</i> 	End-user survey
	<i>Do you think that the pilot VRE can help to perform your work “in the cloud” and support co-development by remote researcher and research teams?</i>	End-user survey
Learning Curve	<i>How do you estimate the effort to learn how to execute a data or knowledge visualization procedure or model simulation feature provided in the pilot VRE?</i>	End-user survey
	<i>How do you estimate the effort to use the pilot VRE to share and publish your own emerging risk data analysis pipeline with the pilot VRE?</i>	End-user survey
Performance, Scalability	<i>How do you rate the performance of the pilot VRE compared to the platform(s) you are used to work with?</i>	End-user survey
	<i>How do you rate the scalability of the pilot VRE?</i>	End-user survey
Openness and FAIRness	<i>How open do you think the pilot and its tools are from the following perspectives?</i> <ul style="list-style-type: none"> - <i>Ease of finding and accessing and reusing datasets</i> - <i>Ease of finding and assessing and reusing analytics and models</i> - <i>Ease of registering and sharing datasets</i> - <i>Ease of registering and sharing analytics and models</i> 	End-user survey
Uptake potential	<i>What is the likelihood that you would use a system as the one demonstrated in the pilot in the future for your work?</i>	End-user survey

4 USE CASE 2 - ASSESSMENT

KNOWLEDGE INTEGRATION PLATFORM - RAKIP

4.1 TARGET USERS

Risk Modeller / Data Scientist:

The use case will illustrate how the VRE infrastructure can facilitate the work of risk modellers or data scientists in the domain of Quantitative Microbial Risk Assessment (QMRA). It is estimated that this group currently consists of around 20-30 persons in Europe as the area is a highly specialized research topic that requires a very interdisciplinary skill-set.

Risk Assessor:

The use case also addresses the community of Risk Assessors that are mainly interested in the application of models generated by Risk Modellers / Data Scientists. It is estimated that this group currently consists of around 30-40 persons in Europe.

SME:

The technology that enable core functionalities of this use case is the open source data analytics platform KNIME. KNIME is developed and maintained by the KNIME.com AG which is a SME with offices in Zurich, Konstanz, Berlin and Austin (Texas). Even though KNIME.com is not part of the RAKIP community, it is expected that the technological solutions developed by BfR within the AGINFRA+ project support the KNIME business model. Because of that, KNIME.com will be invited to attend the evaluation workshop organized for the second pilot VRE version.

4.2 ASSESSMENT OBJECTIVES

The final objective for the assessment of the pilot VREs is to answer the question, if the new web-based resource for the food safety risk assessment community has the potential to serve as a true Open Science community resource in the future. To accomplish this, the generated pilots should go beyond what is currently available, as e.g. the openFSMR (<https://sites.google.com/site/openfsmr/>) or the pure listing of QMRA publications, as e.g. in www.foodrisk.org. Specifically, it will be assessed if the generated pilots (second and third version) can be used to share models in a harmonized format, share data and data-analysis pipelines and perform user-driven computational-intensive simulations in a cloud-based computational infrastructure. Furthermore, it will be assessed if new visualization techniques can be used through the VRE infrastructure. Another important assessment question will be, if there is enough support for the open source data analytics platform KNIME through the VRE.

4.3 ASSESSMENT INDICATORS

The assessment of the first pilot VRE version was performed as an agile in-house hands-on testing process where 3 Data Scientists participated. The participants assessed the “**Usefulness**” by scoring which of the end-user needs identified in the Formative phase (D6.1 - see chapter 2.1.4, 2.1.5, 2.1.6 and 2.1.7) were already available. The assessment was done on the following granularity: available, not available, partly available. The “**Uptake potential**” was assessed by measuring how many dissemination activities were carried out to promote the idea of the RAKIP VRE pilot (number of talks, number of workshops). The “**Learning Curve**” was assessed by expert scoring on “*How do you estimate the effort to learn how to use the RAKIP model repository hosted on the external KNIME Server?*” The “**Openness and FAIRness**” was assessed via an expert review.

The second pilot VRE version will be assessed as a combined training and evaluation workshop. The evaluation will cover all indicators listed under 2.3.2. The participants of the workshop will be asked to vote on the following questions. In addition, this workshop will support the decision which of the features provided by the technical WPs are mature enough to be included in the final third pilot VRE version.

Indicator of the pilot VRE	Rationale and evaluation questions	Assessment method
Usefulness	<i>How do you assess the usefulness of the pilot VRE with regard to the following aspects:</i> <ul style="list-style-type: none"> - <i>Collaboration and communication</i> - <i>Data analytics</i> - <i>Data visualisation</i> 	Qualitative scoring
	<i>Do you think that the pilot VRE can help to perform your work “in the cloud” and support co-development by remote researcher and research teams?</i>	Qualitative scoring
Learning Curve	<i>How do you estimate the effort to learn how to execute a model simulation feature provided in the pilot VRE?</i>	Qualitative scoring
	<i>How do you estimate the effort to learn how to share your own model with the community via the pilot VRE?</i>	Qualitative scoring
Performance, Scalability	<i>How do you rate the performance of the pilot VRE compared to the platform(s) you are used to work with?</i>	Qualitative scoring
Openness and FAIRness	<i>How open do you think the pilot and its tools are from the following perspectives?</i> <ul style="list-style-type: none"> - <i>Ease of finding and accessing and reusing datasets</i> - <i>Ease of finding and assessing and reusing analytics and models</i> - <i>Ease of registering and sharing datasets</i> - <i>Ease of registering and sharing analytics and models</i> 	Qualitative scoring
Uptake potential	<i>What is the likelihood that you would use a system as the one demonstrated in the pilot VRE in the future for your work?</i>	Qualitative scoring

The third pilot VRE version will be assessed as a combined training and evaluation workshop. The evaluation will cover all indicators listed under 2.3.2. The participants of the workshop will be asked to vote on the following questions:

Indicator of the pilot VRE	Rationale and evaluation questions	Assessment method
Usefulness	<i>How do you assess the usefulness of the pilot VRE with regard to the following aspects:</i> <ul style="list-style-type: none"> - <i>Collaboration and communication</i> - <i>Data analytics</i> - <i>Data visualisation</i> 	End-user survey
	<i>Do you think that the pilot VRE can help to perform your work “in the cloud” and support co-development by remote researcher and research teams?</i>	End-user survey
Learning Curve	<i>How do you estimate the effort to learn how to execute a data or knowledge visualization procedure or model simulation feature provided in the pilot VRE?</i>	End-user survey
	<i>How do you estimate the effort to use the pilot VRE to share and publish your own model with the community via the pilot VRE?</i>	End-user survey
Performance, Scalability	<i>How do you rate the performance of the pilot VRE compared to the platform(s) you are used to work with?</i>	End-user survey
	<i>How do you rate the scalability of the pilot VRE?</i>	End-user survey
Openness and FAIRness	<i>How open do you think the pilot and its tools are from the following perspectives?</i> <ul style="list-style-type: none"> - <i>Ease of finding and accessing and reusing datasets</i> - <i>Ease of finding and assessing and reusing analytics and models</i> - <i>Ease of registering and sharing datasets</i> - <i>Ease of registering and sharing analytics and models</i> 	End-user survey

Uptake potential	<i>What is the likelihood that you would use a system as the one demonstrated in the pilot in the future for your work?</i>	End-user survey
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5 TENTATIVE PILOT TRIALS SCHEDULE

The pilot VRE development and the assessment trials will be carried out according to the following schedule (which takes into account the necessary technological developments to be carried out by WP2, 3, 4 and 6):

Formative phase: start: 01/2017 end: 12/2017
=> No pilot VRE development
=> No pilot VRE assessment

Intermediate phase:
=> Development of first pilot VRE versions start: 09/2017 end: 06/2018
=> Process of end-user engagement into VREs start: 09/2017 end: 12/2019
=> First pilot VRE versions assessment (agile): start: 01/2018 end: 06/2018

The assessment of the first pilot VRE versions generated in the Intermediate phase (until month 18) was done by BfR and has been integrated into the agile development process carried out by WP6. This implied that the assessment was restricted in terms of scale (3 experts) and complexity (see 3.3 and 4.3). Some details on the assessment results of this phase will be reported in the version of D6.4 that will be given in M30.

Summative phase:
=> Development of second pilot VRE versions: start: 10/2018 end: 06/2019
=> Second pilot VRE versions assessment: start: 03/2019 end: 06/2019

The assessment of the second pilot VRE versions generated in the Summative phase (until month 30) will be done by conducting one expert workshop per use case in the BfR premises in Berlin. It is expected that each of these workshops can attract 20 participants. A higher number of participants is from a didactical point of view not reasonable.

=> Development of third pilot VRE versions: start: 07/2019 end: 09/2019
=> Third pilot VRE versions assessment: start: 08/2019 end: 09/2019

The assessment of the third pilot VRE versions generated in the Summative phase (until month 33) will be done by BfR by conducting a workshop for the RAKIP community alongside the ICPMF11 conference held in Braganza, Portugal in September 2019 and an online webinar for the DEMETER community in September 2019. It is planned to achieve with each of these assessment activities 30 participants from each the corresponding communities.