



www.egi.eu

@EGI_eInfra

Service Evaluation, Why & How

*ENVRI-FAIR Training Event on Service
Validation and Evaluation*

Yin Chen, EGI Foundation

17th Jun 2022



The work of the EGI Foundation
is partly funded by the European Commission
under H2020 Framework Programme

- **Validation**

- To confirm the examined service is meet requirements (functional, performance, user experiences)

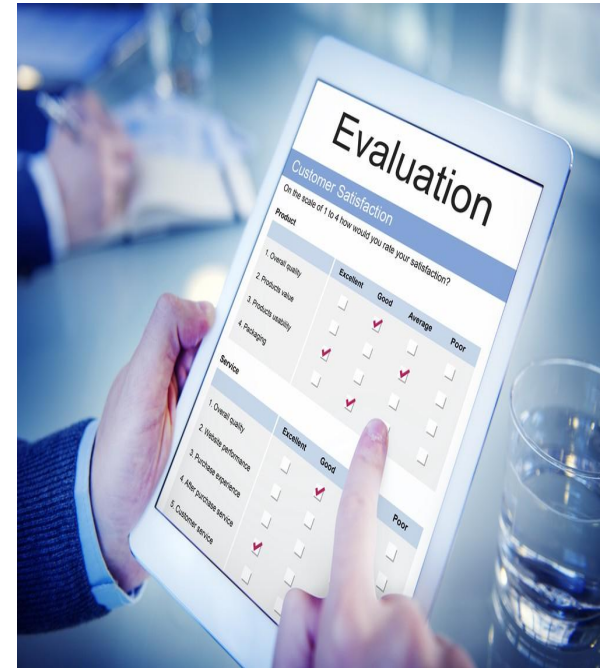


- **Evaluation**

- To produce a recommendation (e.g., on service readiness, successful adoption)
- To propose improvements (e.g., for service design)



- Essential for Co-design that centered on collaborative process
- Provide concrete evidence that the Co-design outcomes match users' needs
- Effectively uncover rich levels of user feedbacks and suggestions
- Facilitate improvements in service features design
- Crucial for successful adoption, user engagement, service promotion



- For Lower TRL¹,

- TRL1 Basic principles observed (*ideas*)
- TRL2 Technology concept formulated (*design*)
- TRL3 Experimental proof of concept (*proof of concept*)
- TRL4 Technology validated in lab (*pilots*),
- TRL5 Technology validated in relevant environments (*use cases*)
- TRL6 Technology demonstrated in relevant environment (*demos*)
- TRL 7 System prototype demonstration in operational environment (*prototype*)
- TRL 8 System completed and qualified (*production*)
- TRL 9 Actual system proven in operational env (*operation*)

Not feasible for
code audit,
testing etc.

- Used in Co-design process

- Used for successful innovation adoption

1. EOSC definition of TRL levels <https://www.eosc-hub.eu/news/eosc-hub-contribution-eosc-open-consultation-rules-participation>

Essential for Co-design

What is Co-Design?

- **Co-Design**¹: ‘Collaborative design’, design with people who will use or engage with a service or product
- A methodology for actively engage a range of people directly involved in a issue, place or process in its design (sometimes) also in implementation

- Evaluation provides recommendations, improvement for design
- Enabled **tacit knowledge** and **latent and evolving user needs** to be **discovered** and **addressed**

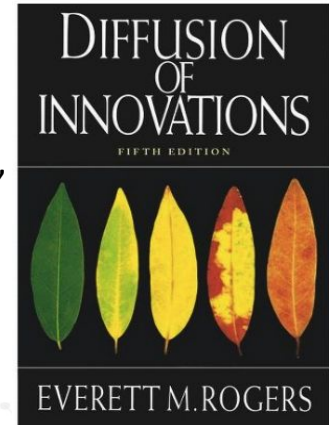


“Co-design = working side by side. Not Top Down. Not Bottom Up”

¹An introduction to Co-design, I. Burkett, <http://ingridburkett.com/wp-content/uploads/2017/09/Introduction-to-Codesign-2.pdf>

What drives successful adoption?

- **Successful adoption is one of the most important impacts factors**
- **Diffusion of innovations** – a theory that seeks to explain how, why and at what rate new ideas and technology spread (*Diffusion of Innovation, book by Everett Rogers, 5th Edit 2003*)
 - **Definition:** Diffusion is a process that innovation is communicated over time among the participants in a social system
 - **5 main elements make impacts/influence:** 1) innovation itself, 2) adopters, 3) communication channels, 4) time, and 5) a social system
 - **5 stage in adoptions process:** 1) awareness/knowledge, 2) interest/persuasion, 3) evaluation/decision, 4) trial/implementation, 5) adoption/conformation
 - **Adoption strategies:**
 - Adopted by a highly respected individual within a social network
 - **Inject an innovation into a group of individuals who would readily use technology, providing positive reactions, benefits for early adopters**



Attributes for Successful Innovation Service Adoption

What drives the successful adoption of e-Science Innovation Services ?

- EGI research with Kerk F. Kee, Chapman University, U.S., 2016, based on Innovation Diffusion theory
- To find out “**What attributes promote the adoption and discussion of computational tools for e-Science?**”
- Survey data collected from the e-Infrastructure communities in US, Europe

Innovation Attributes	Scores (range: 1-7)
<u>Driven by Needs</u>	(6.00)
<u>Documentation</u>	(5.92)
<u>Community Driven</u>	(5.85)
<u>Ease of Use/Simplicity</u>	(5.77)
<u>Perceived Compatibility</u>	(5.77)
Trialability	(5.70)
Relative Advantage	(5.70)
Visibility/ Observability	(5.15)
Organized Access	(4.92)
Adaptability	(4.92)

Organizational Attributes	Scores (range: 1-7)
<u>Having Bridging Liaison</u>	6.17
<u>Growing Organizational Capacity</u>	5.91
<u>Engaging User Feedback</u>	5.83
<u>Raising Sustainable Funding</u>	5.67
<u>Maintaining Staff Continuity</u>	5.67
Meeting Face-to-Face	5.50
Having Clear Roles	5.42
Setting Shared Goals	5.33
Using a Common Language	5.33
Having Multidisciplinary Expertise	5.17
Establishing Productive Routines	5.00
Demonstrating Altruistic Leadership	5.00

Reference for evaluation criteria of successful innovation service adoptions

¹An introduction to Co-design, I. Burkett, <http://ingridburkett.com/wp-content/uploads/2017/09/Introduction-to-Codesign-2.pdf>

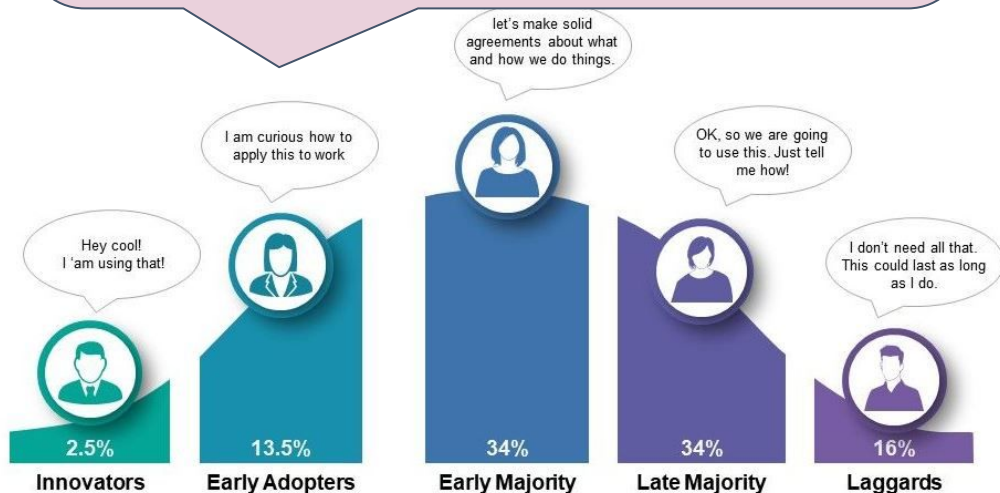
Who are your target adopters?

Not everyone will adopt your innovation services

Opinion leadership

- Influential in spreading positive or negative opinions/information
- Greater exposure to mass media, greater contact with change agents, more social/exposure, high socioeconomic
- Most influence during evaluation
- Most influence on later adopter

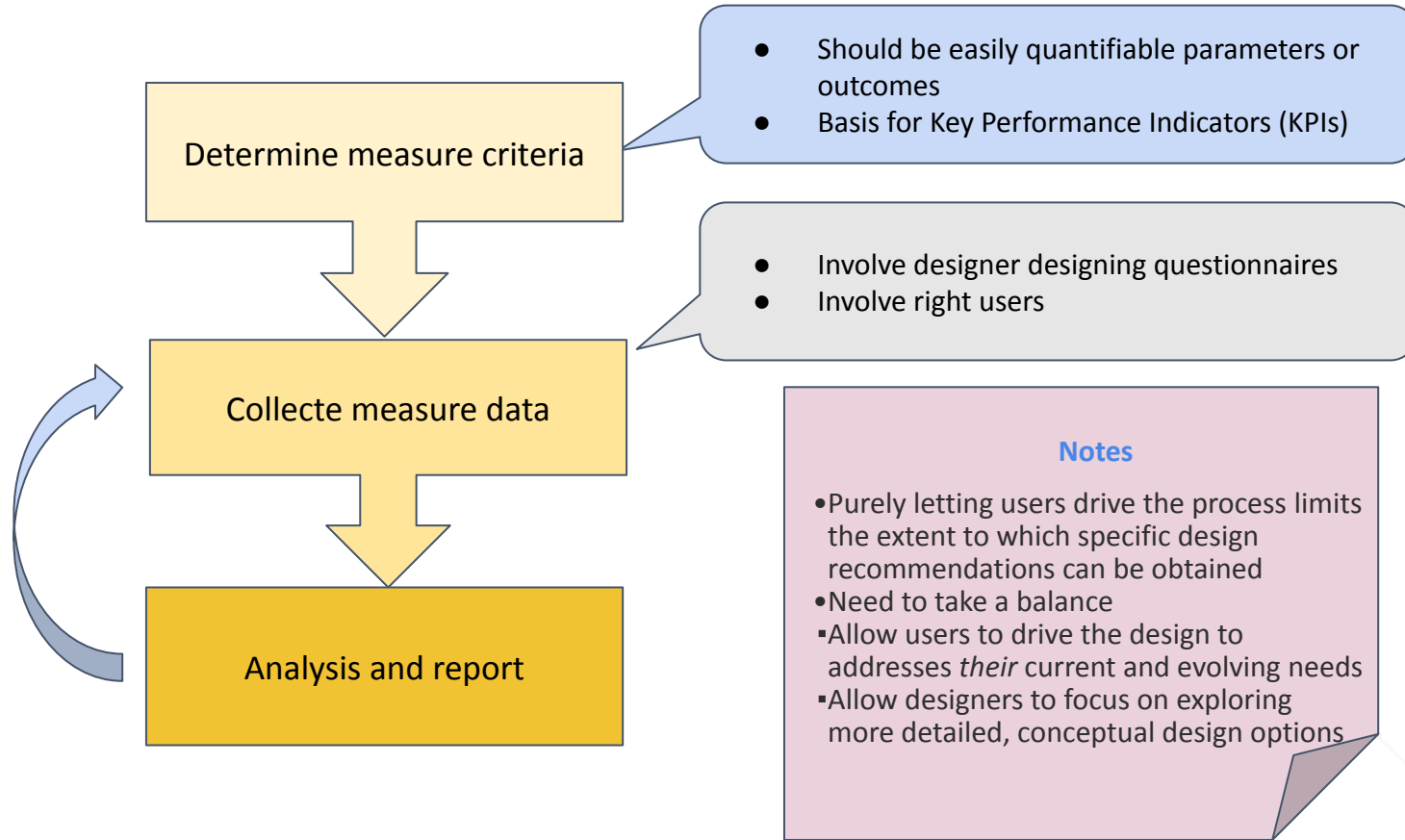
- Early Adopters are normally the best targets for e-Science innovation services
- Involve Opinion leadership in Service Evaluation process



Characteristics of organisations:

- In general, decisions made by consensus (need to talk to right people)
- Tension for change spreading among individual members (e.g. EGI adopted Cloud in 2013)
- Changes can be easy to assess
- Innovation is diffusing through the organisation
- Innovations are intentionally spread, by political mandate or directive (e.g. EC Open Science policies)

Methodology for Service Evaluation



- ENVRIplus (2015-2019) WP9 Service Validation and Evaluation
 - T9.1 – Developed 13 Science Demonstrators
 - T9.2 – Evaluation of the ENVRIplus Science Demonstrators
 - Determined evaluation criteria based on project KPIs, attributes for successful adoption
 - Explored different stakeholder groups that likely to be the Early Adopter
 - Designed questionnaires
 - Developed online survey
 - Engaged with users and collected feedback
 - Online Results statistic



TABLE 2. SCIENCE DEMONSTRATORS INCLUDED IN THE EVALUATION TOOL.

Science demonstrator name	Contact person, wiki entry & YouTube video
SD1: Support EISCAT_3D Users to Reprocess Data Using User's Algorithms (Use Case IC_3)	<ul style="list-style-type: none"> • Contact person: Ingemar Häggström (EISCAT) • ENVRI wiki entry • YouTube video
SD2: The eddy covariance fluxes of GHGs (Use Case IC_13)	<ul style="list-style-type: none"> • Contact person: Domenico Vitale (UNITUS) • ENVRI wiki entry • YouTube video
SD3: SDS & SSN ontology based Data Acquisition and NRT Data Quality checking services (Use Case IC_14)	<ul style="list-style-type: none"> • Contact person: Robert Huber (UniHB) • ENVRI wiki entry • YouTube video
SD4: EuroArgo Data subscription service (Use Case TC_2)	<ul style="list-style-type: none"> • Contact person: Thierry Carval (Ifremer) • ENVRI wiki entry • YouTube video
SD5: Sensor registry (Use Case TC_4)	<ul style="list-style-type: none"> • Contact person: Justin Buck (Euro-Argo) • ENVRI wiki entry • YouTube video
SD6: New particle formation event analysis on interoperable Infrastructure (Use Case TC_12)	<ul style="list-style-type: none"> • Contact person: Markus Stocker (UniHB, TIB) • ENVRI wiki entry • YouTube video
SD7: gCube-based VRE for Mosquito Diseases Study (Use Case SC_2)	<ul style="list-style-type: none"> • Contact person: Baptiste Grenier (EGI) • ENVRI wiki entry • YouTube video
SD8: Dynamic Ecological Information Management System – Site and Dataset Registry (DEIMS-SDR) *	<ul style="list-style-type: none"> • Contact person: Christoph Wöhner (EAA) • ENVRI wiki entry • YouTube video
SD9: PROV-Template Registry and Expansion Service (Use Case IC_10)	<ul style="list-style-type: none"> • Contact person: Doron Goldfarb (FAA) • ENVRI wiki entry • YouTube video



Youtube videos

ENVRIplus [D9.1 Service deployment in computing and internal e-Infrastructure](#),
Chen et al. 2019

General	Description
Accessibility/ Ease of use	Related to technical skill & knowledge level of adopter, quality and depth of documentation, potential need for access to specific data centres or technologies, etc.
Degree of adoption	Number of RIs or similar organizations that have adopted a service? How many individual users?
Maturity	Can be a scale from idea/best practice recommendation, proof-of-concept, demonstrator/pilot, operational system – compare with the Technical Readiness Level scale used by e.g., EC evaluators.
Sustainability	To what extent is the quality of engineering good enough. Is there a committed team that can grow as needed, e.g., through open-source governance, to continue development, handle maintenance and support technical questions our own RIs' support teams cannot answer?
Visibility	Has the service been well advertised/disseminated outside of ENVRplus?
Impact	Impact of the service being used or available
Portability	To what extent is it tied to a particular platform, toolset, language or data model. Will it embrace standards and enable innovation?
Scope	How many aspects of the data lifecycle are involved? How many categories of expertise will this help?
Potential	Does this direction and skeleton/conceptual framework provide a good platform on which to continue to build?
Depth	What proportion of the technical practical and system details does this address?

Example for Evaluation Criteria

ENVRIplus Specific	Description
Involvement of partners	How many RIs have been interested in contributing actively in the development (through agile teams or similar)?
Domain coverage	How many domains can make use of the service?
Scope	How many WPs are affected (e.g., how many 'pillars' and 'cross-teams' are related) ?
Explicit ENVRIplus contribution	Would the service have been developed anyway, or was ENVRIplus instrumental in the process?
Adoption by partner RIs	Number of ENVRIplus partners that have adopted the service (in whole or in part). How many individual users?

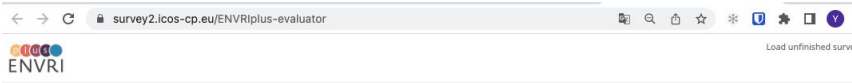
ENVRIplus [D9.1 Service deployment in computing and internal e-Infrastructure](#), Chen et al. 2019

Online Survey

<https://survey2.icos-cp.eu/ENVRiplus-evaluator>

Results Statistics

<https://survey2.icos-cp.eu/ENVRiplus-evaluator-summary>



ENVRiplus Science Demonstrator evaluator (D9.4)

This survey-based service evaluation tool demonstrator has been developed in the framework of ENVRiplus Work Package 9, "Service validation and deployment". The tool is described in more detail in the ENVRiplus deliverable report "D9.4 Serving key data service stakeholders and policy initiatives version 2", available at <http://www.envrplus.eu/deliverables/>. If you have questions or concerns about the survey and how your answers are managed, please get in touch with Maria Johansson (maria.johansson@uk.lu.se) and Margareta Hellström (margareta.hellstrom@natek.lu.se).

Welcome to the ENVRiplus WP9 Science Demonstrator evaluation tool!

This evaluation tool demonstrates how one can collect feedback on services by using the ENVRiplus Science Demonstrators (as defined in ENVRiplus deliverable 9.2) as examples. The main objectives of this Demonstrator are to 1) provide experience of how to build a service evaluation tool based on a generic survey platform like LimeSurvey, and 2) allow the ENVRiplus community to give feedback to the developer teams behind the Science Demonstrators.

Please note that the Science Demonstrators are not "fully developed" services, but rather reflect relatively early stages of development. For this reason, some of the common questions may be difficult to answer, or appear to be less than 100% applicable. We hope that this won't be too much of a problem.

At the end, you will be able to leave feedback on the survey itself. To make this easier, all questions have a number - please note down the number of any "problem questions" as you go along, so that you can report back to us - this will really be a great help to the survey development team! (Depending on the choices you make, some questions may not be shown - this is not an error!)

Thank you for your participation!

GDPR Notice

We hereby highlight that personal data of those who participate in the survey will be collected and stored. The responses, including personal data, will be stored in a safe way during the survey, and not shared with any party outside of the ENVRiplus project context. The survey responses will be deleted no later than 18 months after the conclusion of ENVRiplus. To participate in the survey you must acknowledge having read this notice and that your personal data can be stored.

I acknowledge that I have read the GDPR notice, and accept that my survey response, including any personal data, is stored

Next

ENVRiplus Science Demonstrator evaluator (D9.4)

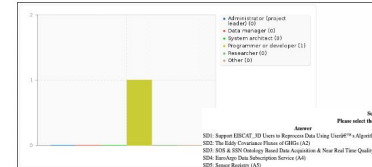
Total records in survey: 1

Results
Number of records in this query: 1
Total records in survey: 1
Percentage of total: 100.00%

Summary for PROFILES02H0423

What is your professional role? Tick all that apply.

Answer	Count	Percentage
Administrator (SQ001)	0	0.00%
Data manager (SQ002)	0	0.00%
System architect (SQ003)	0	0.00%
Programmer or developer (SQ004)	1	100.00%
Researcher (SQ005)	0	0.00%
Other	0	0.00%



Summary for SCIDEM000010

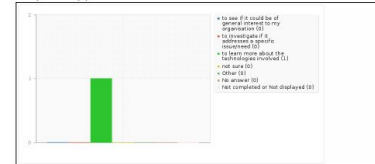
Please select the Science Demonstrator you are evaluating:

Answer	Count	Percentage
SDE: Support EDC/CF_2D Data in Response Data Using Usable™ A Algorithms (A1)	0	0.00%
SDE: The EDC/CF_2D Data in Response Data Using Usable™ A Algorithms (A2)	0	0.00%
SDE: SDE & SDE On-demand Based Data Acquisition & Near Real Time Quality Control (A3)	1	100.00%
SDE: Sample Data Acquisition Service (A4)	0	0.00%
SDE: SDE Support (A5)	0	0.00%
SDE: New particle formulae create analysis on interpretable information (A6)	0	0.00%
SDE: SDE on-demand EDC/CF_2D Data in Response Data Using Usable™ A Algorithms (A7)	0	0.00%
SDE: Dynamic Ecological Information System: Site and Disease Registry (A8)	0	0.00%
SDE: SDE: Sample Data Acquisition Service (A9)	0	0.00%
No answer	0	0.00%
Not completed or Not displayed	0	0.00%

Summary for MAINREASON0000

What is the main reason for you to evaluate this science demonstrator?

Answer	Count	Percentage
to see if it could be of general interest to my organization (A1)	0	0.00%
to investigate if it addresses a specific need/wanted (A2)	0	0.00%
to learn more about the technologies involved (A3)	1	100.00%
not sure (A4)	0	0.00%
Other	0	0.00%
No answer	0	0.00%
Not completed or Not displayed	0	0.00%



Summary for SCIDEM000010

Please select the Science Demonstrator you are evaluating:

Answer	Count	Percentage
SDE: Support EDC/CF_2D Data in Response Data Using Usable™ A Algorithms (A1)	0	0.00%
SDE: The EDC/CF_2D Data in Response Data Using Usable™ A Algorithms (A2)	0	0.00%
SDE: SDE & SDE On-demand Based Data Acquisition & Near Real Time Quality Control (A3)	1	100.00%
SDE: Sample Data Acquisition Service (A4)	0	0.00%
SDE: SDE Support (A5)	0	0.00%
SDE: New particle formulae create analysis on interpretable information (A6)	0	0.00%
SDE: SDE on-demand EDC/CF_2D Data in Response Data Using Usable™ A Algorithms (A7)	0	0.00%
SDE: Dynamic Ecological Information System: Site and Disease Registry (A8)	0	0.00%
SDE: SDE: Sample Data Acquisition Service (A9)	0	0.00%
No answer	0	0.00%
Not completed or Not displayed (S)	0	0.00%

[ENVRiplus D9.4 Serving key data service stakeholders and policy initiatives](#), Hellström et. al. 2019

EGI: Advanced Computing for Research

Thank you
for your attention.

Questions?



The work of the EGI Foundation
is partly funded by the European Commission
under H2020 Framework Programme

This work by the EGI Foundation
is licensed under a Creative Commons
Attribution 4.0 International License.



www.egi.eu
[@EGI_eInfra](https://twitter.com/EGI_eInfra)