



RESILOC

Resilient Europe and Societies by Innovating Local Communities

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Abstract

This Deliverable D4.3 Verification report presents the findings from the verification activities carried out to assess the extent to which the RESILOC platform meets user needs and requirements. The verification task adopted a usability studies approach, involving 15 core RESILOC local resilience team members from three RESILOC communities in the testing of the platform. Through non-participant observations, focus groups, an adapted 10-item system usability questionnaire and interviews with relevant RESILOC partners we generated rich qualitative and quantitative data on the usability of the RESILOC platform and areas for improvement.

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VI. List of Acronyms

Acronym	Meaning
D	Deliverable
DOA	Description of the Action
ICT	Information and Communication Technology
LRT	RESILOC Local Resilience Team
WP	Work Package

The terminology used within this report is defined within the Base and Project Glossaries¹. The terms and phrases used within this document have the meanings described by the glossary unless explicitly described otherwise in the relevant text.

¹ <https://www.resilocproject.eu/publication/>



1 Executive Summary

This Deliverable D4.3 Verification results presents the findings from a suite of verification activities involving 15 members of the RESILOC Local Resilience Teams.

The purpose of the verification task T4.3 was to assess whether / how far the RESILOC platform meets user needs from a technological perspective. Through a co-creation process with the communities leading the trials of the RESILOC platform, a multi-methodological verification process was developed, consisting of non-participant observations of platform use, focus groups, translation and distribution of our adapted Brooke's 10-item system usability questionnaire (Brooke, 1996) and RESILOC partner interviews. With the help of these methods we sought to explore the user satisfaction, usability, efficiency, effectiveness and flexibility of the RESILOC platform. These verification activities were implemented in the local languages of the RESILOC communities in combination with relevant RESILOC field trial activities. 15 members of the RESILOC core local resilience teams (LRT) participated in the verification work, nearly two thirds of them male and most with intermediate ICT skills. Half of participants were experts (including, for example, a civil engineer, a geologist and a lawyer); nearly a quarter were members of humanitarian aid organisations.

In terms of **user satisfaction**, most users stated they would like to use the RESILOC platform frequently and believed it could be useful for local resilience assessments. They thought the system was easy to use and identified a few features that were not so user friendly or did not work. A key improvement suggestion related to offering a default setting when creating a new scenario on the platform.

In terms of **usability**, verification participants overall felt confident using the RESILOC platform though a small majority also felt that they would need technical support to use it. Some spoke to going through a learning curve when working with the system, and the likely challenges for non-technical audiences to work with it. Adding further user support such as integrating information on the RESILOC methodology and a manual into the platform, a training course and building a social support system (individual or network of users) were key recommendations. In addition, improving the appearance of error messages, the consistency with which the turning wheel appears as a symbol for processing information and adding a legend to the resilience image would help users with this learning process. Users thought the RESILOC platform is well designed. Nevertheless, they raised substantial usability challenges stemming from the unstructured display of a large volume of proxies and indicators on the platform and their lack of pre-existing translation into languages other than English. The former created uncertainties among users and led to the recommendation to display proxies in a more structured manner on the platform. Defining proxy values and other necessary information was made more awkward by the lack of definitions in the platform, some inconsistencies between data types required by a qualitative indicator and the number format accepted by the platform and lack of editability of a proxy.

Whilst users did not experience the platform as cumbersome to use, in terms of **efficiency** the above challenges with indicators and proxies led to the unnecessary action of creating, and then working in, a separate spreadsheet which replicates the RESILOC resilience dimensions, associated indicators and proxies (as articulated in D2.8) and subsequently transferring this information into the platform. This was experienced as time consuming, further augmented by the need to search for proxies on the platform with keywords rather than exact titles. An increase in server capacity led to a significant reduction in platform crashes, though on occasion too slow or too fast responses by the RESILOC platform could still cause problems in users' workflow.



An issue with incorrect colour coding in the final resilience assessment identified during one verification workshop was subsequently resolved, though deleting an indicator does sometimes not work correctly and searching for a proxy sometimes does not produce results. The platform can be used across emergency scenarios (though was seen as more useful for some than for others by users responding to the system usability survey) and allows flexibility in terms of indicator / proxy choice to address local circumstances. However, there was a sense that it was less suited for small communities due to their inherent lack of financial and human resources.

The verification work has therefore shown that the RESILOC platform as a piece of technology is well designed and navigable with some basic accessibility features, with users recognising the potential value of the platform. Using its features and functionality to carry out resilience assessments, however, has shown to be impacted primarily by how relevant content is displayed on the platform and needs to be worked with which is particularly affecting the experience of non-technical / resilience experts and small communities. In its current format, these challenges can be addressed by additional user guidance embedded in the platform and a social system to support use. In future iterations of the platform, the challenges experienced should be addressed to support wider use. The question that needs to be worked with as part of these processes is to what extent the RESILOC platform should be explicitly communicated as one necessary but not standalone (technical) part of a system for assessing community resilience that requires in any case significant input by relevant people (i.e., a social system) to ensure its effective working.



2 Introduction

This Deliverable D4.3 reports on the results of Task (T) 4.3 Verification. The purpose of T4.3 was to assess whether / how far the RESILOC platform meets user needs from a technological perspective. Adopting a Usability Study approach, the aim of T4.3 was to involve RESILOC platform users actively in the verification exercise and hence allow them to contribute to improving the usability, user-friendliness, efficiency and effectiveness of the platform and its application environment. This Deliverable reports on the implementation of T4.3 and the results from the verification activities.

2.1 Situating the RESILOC platform verification in the project context

The implementation of Task 4.3 Verification needs to be situated in the wider RESILOC project context, most notably the development of the RESILOC platform and the implementation of the RESILOC field trials.

As the description of T4.3 in the Description of Action (DOA) articulates, the **development of the RESILOC platform** used an agile methodology, implemented via a sprint-based development process (RESILOC D4.6, p ii). Prior to the start of the verification activities, four of a total of five sprints had been completed to “check if users’ needs and expectations have been met, or it is [sic] desirable / recommended to adopt some changes” (RESILOC D4.6, p. 49). The RESILOC platform had been included in all four sprints, and was tested with a group of core users from within the RESILOC consortium, representing the RESILOC communities. This process led to 20 functionality improvements (RESILOC D4.6, pp 56-57) to the RESILOC platform. User data from the third and fourth sprints suggested that the platform was “quite user friendly” and “facilitating a learning process” (RESILOC D4.6, p. 51). End users represented in the RESILOC consortium approved the platform for trial use at the end of the fourth sprint before the start of the RESILOC field trials.

The purpose of the four **RESILOC field trials** - taking place in Catania (Italy), Gorizia (Italy), Tetovo (Bulgaria), West Achaia (Greece) from January through to September 2022 - was to “evaluate and validate the outcomes of the project” by testing (“confirming”) whether the RESILOC platform can be used as a tool for local strategic planning on resilience (D5.4, p. 8 and p. 15). Each trial consisted of capacity building and exercise workshops (D5.4, p. 29). During the exercise workshops, members of the local LRTs were working with the RESILOC platform to build resilience assessments for several locally chosen ‘scenarios’. The RESILOC field trial design as outlined in the April 2022 version of D5.4 integrates two evaluative activities into the field trials. First, validation activities (implemented by task 5.6) aim to – broadly – assess the suitability of the RESILOC solution to improving strategies for community resilience. Second, verification activities (implemented via T4.3 as well as development tasks of WP4) aim to assess the fitness for purpose (in terms of user needs and user requirements) of key RESILOC tools – most notably the cloud platform. The distinction between validation and verification is discussed in some depth in D5.6.

Figure 1 below illustrates how platform development, verification, field trials and validation work together and shows the task and organisational boundaries of implementing these activities. It shows that the verification task is implemented in two stages, corresponding to the process adopted by the project outlined above. First, as part of the platform development during the sprints RESILOC community members that are part of the RESILOC consortium provided feedback on the different components of the RESILOC platform and wider system. Second, a series of workshops with core users aimed to verify the RESILOC system in use to check whether or not the RESILOC platform as core component of the RESILOC system complies with the user needs, requirement and expectations of the local communities more widely. Task

5.4 Field Trial Validation, finally, focuses on analysing data from the RESILOC field trials to assess the RESILOC model as a whole.

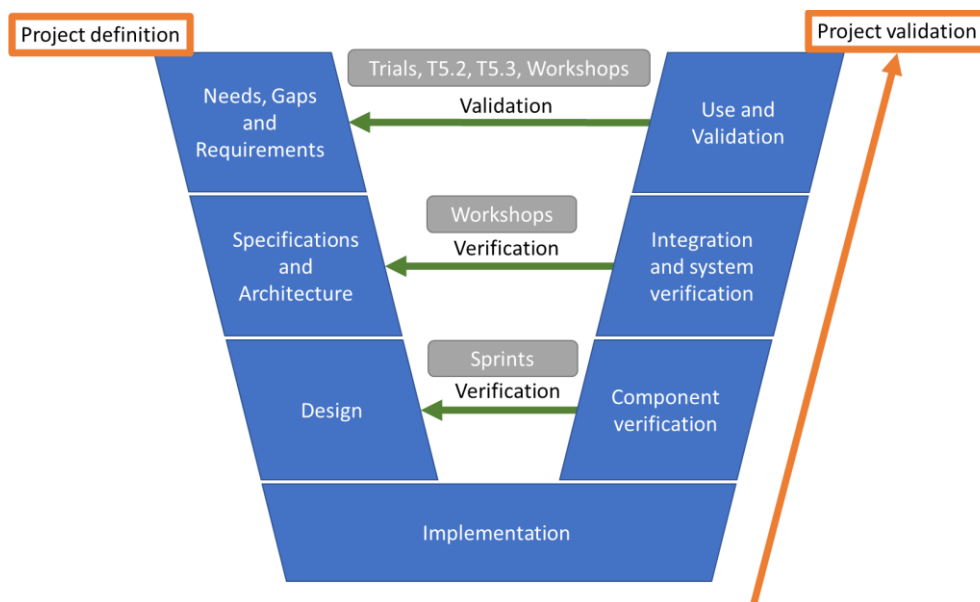


Figure 1: RESILOC V-model for verification and validation

2.2 Designing Task 4.3

As is illustrated in Figure 1 above, to be useful for project purposes, avoid duplication of work and make best use of participants' time, the verification activities needed to be carefully designed, both methodologically and in terms of implementation. To achieve this, we engaged in an extensive dialogue and co-creation process with RESILOC partners leading and implementing WP4 (Implementation of the RESILOC platform) and WP5 (Communities involvement and field trials). We joined relevant sprints; engaged with WP5 leads in discussions on the relationship and implementation of verification versus validation activities; and spoke with the leads of the four RESILOC communities about the details of trial implementation and the execution of verification activities.

These conversations surfaced several practical issues which needed to be considered in the design of the verification methodology. Most notably these were:

- The need to adjust to community members' native languages.** In accordance with T4.3, we aimed to include at least 10 people from the group of potential users (including citizens) in the verification task via one user panel verification workshop. Conversations with trial leads in the four RESILOC communities, quickly revealed that at least half of core LRT members in each site did not have a sufficiently strong command of English to participate in an English-speaking verification workshop. For this reason, we took the decision to embed the verification work in the RESILOC trial sites and implemented three verification workshops (rather than just one as outlined in the DOA).² This allowed us to implement the task in the local languages and hence maximise participation of core LRT members in the verification exercise.

² One set of trial activities took place too late to be included into this Deliverable and presented logistical difficulties for implementing an observation. Relevant data from an interview after the community's dry run has been incorporated into this Deliverable. In subsequent chapters, when referring to the communities involved in the verification work, we have chosen to anonymise them to preserve the anonymity of those involved in the task by labelling them Community 1, Community 2, Community 3 and Community 4.



- **Synergies with the RESILOC field trials.** The RESILOC field trials implemented in the communities included tabletop exercises: half-day workshops in which core members of the local resilience teams (LRTs) were required to use the RESILOC platform to create local resilience assessments in different scenarios. This involved hands-on work with the RESILOC platform, navigating across all areas of functionality. As these workshops involved the same tasks envisaged in T4.3 description for the verification workshop and as local core LRT members came from emergency services or were volunteers and we hence wanted to be careful with how we use their time, we decided, together with RESILOC partners leading the trials in the RESILOC communities, to peg verification activities onto these tabletop exercises. This was facilitated by RESILOC partners incorporating verification activities into relevant trial workshops, and slightly extending the duration of these workshops to allow for the implementation of verification focus groups
- **The sequential starting dates of the RESILOC field trial in the communities.** Whilst the RESILOC field trial covered the same period in all communities, starting and finishing dates varied. The communities located in Italy started first, followed by the communities in the remaining two countries. We saw this as creating two potential opportunities: regarding the verification methodology, to test the initial design and potentially improve it; regarding the data collection from verification, to feed this into the ongoing improvement to the RESILOC platform. Verification activities were therefore implemented during May and June 2022.
- **A focus of verification activities on the RESILOC platform** as the core tool of the project's approach to community resilience assessment.

We fed these insights into the design of the RESILOC verification methodology which we present in the next section below.

2.3 Methodology devised for the RESILOC verification activities

As articulated in the DOA, the verification methodology adopted a usability study approach. “Usability testing refers to evaluating a product or service by testing it with representative users. (...) The goal is to identify any usability problems, collect qualitative and quantitative data and determine the participant's satisfaction with the product” (usability.gov, 2022). The usability study approach to RESILOC platform verification aimed to involve members of the RESILOC trial communities and LRTs as co-collaborators who would contribute to improving the usability, user-friendliness, efficiency and effectiveness of the platform and its application environment.

To achieve this, we used four data collection methods in each of the verification workshops implemented:

1. **Non-participant observation of users navigating the platform during pre-dry runs (“hands-on ‘walk-through’ of the platform”).** This involved members of the TIHR team involved in the verification exercise and RESILOC partner BILSP joining relevant pre-dry run workshops to observe and note users' interactions with the RESILOC platform, including any questions raised, problems experienced, and solutions found. An observation schedule was designed to help researchers record their observations. This consisted of two parts: a description of the trial activity setting (where the trial is located, the space LRT members were working in, what technology was used to access the RESILOC platform, group size and any other points relevant to the setting); a table that invited the researchers to describe the type of activity trial participants were completing, their observations regarding details of what community members were doing, how they were doing it, difficulties / challenges encountered, questions raised



and discussed, and any other events that seemed relevant. One schedule was completed for each of the RESILOC communities involved in the verification exercise; two communities also provided a second set of shorter observations from a later dry run workshop.

2. **A semi-structured focus group interview** immediately after the end of the observation in the form of “retrospective probing”.³ “Retrospective probing is employed to gain an understanding of those elements of the product that have a great positive impact in the user’s minds as well as those aspects or issues that affected the User’s Experience negatively” (think.design, 2022). In the focus group interviews, researchers first played back to RESILOC platform users specific user-platform interaction events they observed during the tabletop exercise and invited users to explain what was happening for them during these moments. This was followed by questions on users’ perceptions on user satisfaction, usability, effectiveness, efficiency, flexibility and accessibility as well as recommendations for improvement.⁴ A summary of focus group results was provided for each of the RESILOC communities involved in the verification exercise.
3. Finally, LRT members were asked to complete the **10-item System Usability Scale (Brooke, 1996)**, adapted to RESILOC through translation into the local community languages (Italian and Bulgarian) and by adding three questions aimed at facilitating contextualisation of the survey results: gender and self-assessed ICT literacy as well as a question on users’ perceptions on the usability of the platform for different disaster scenarios⁵. By offering completion of the system usability scale as a separate activity, which was completely anonymised, rather than integrating it into the focus group interview, we wanted to enable core LRT members to give their opinion potentially more freely than in a focus group setting whilst also adding more structured data to the more qualitative information provided by the observations and focus group interviews. In two locations, this questionnaire was delivered twice to allow us to explore any changes in usability perception as familiarity with the platform grew between trial workshops.
4. **The verification task completed in all participating communities** with interviews with RESILOC consortium members involved in preparing and running the trials in the RESILOC communities, to contextualise findings from the user verification exercise and understand usability of the platform from their perspective.

Qualitative data was analysed with the qualitative data analysis computer software package NVIVO⁶. Using content analysis and applying an approach based on ‘reduction’ (Creswell, 2013), we focused on identifying convergences and divergences in user feedback patterns. Quantitative data from the usability survey was analysed using simple descriptive statistics.

³ This replaces the concurrent think around (CTA) and concurrent probing (CP) techniques mentioned in the DOA in acknowledgement of the fact that integrating verification into the field trials makes these methodologies unlikely to be usable.

⁴ The criteria for verifying the usability of the RESILOC platform were co-designed with WP5 Validation as part of the process of delineating the verification task T4.3 from the WP5 validation activities. As part of the suite of validation tools offered to partners, WP5 had designed a usability questionnaire which incorporated criteria from relevant ISO standards (ISO 9126, ISO 9241, ISO / IEC 25022 and 25023). After reviewing each of the criteria and sub-criteria and their definition, we excluded a number of criteria (e.g., portability, maintainability, appropriateness recognisability) and sub-criteria (e.g., resources utilisation, security, interoperability) as out of scope for T4.3 as better covered either by Task 4.2 or Task 5.4 Validation. Data on the remaining criteria were to be collected via the verification focus groups or system usability questionnaire.

⁵ LRT members were given the option to not answer these questions.

⁶ <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>



Before presenting the results of the verification activities in the next chapter 3, the section below explains the number and types of core LRT members who were involved in the verification work.

2.4 Implementing T4.3: participants and survey responses

A total of 15 core LRT members were involved in the verification activities. These were classified into the primary roles from which they participated in the trials and hence verification activities. The largest category was 'experts' (six participants, including for instance a civil engineer, a geologist and a lawyer) followed by humanitarian aid organisations (four participants). Two participants represented municipalities, and one each came from civil protection, the police or was a citizen.

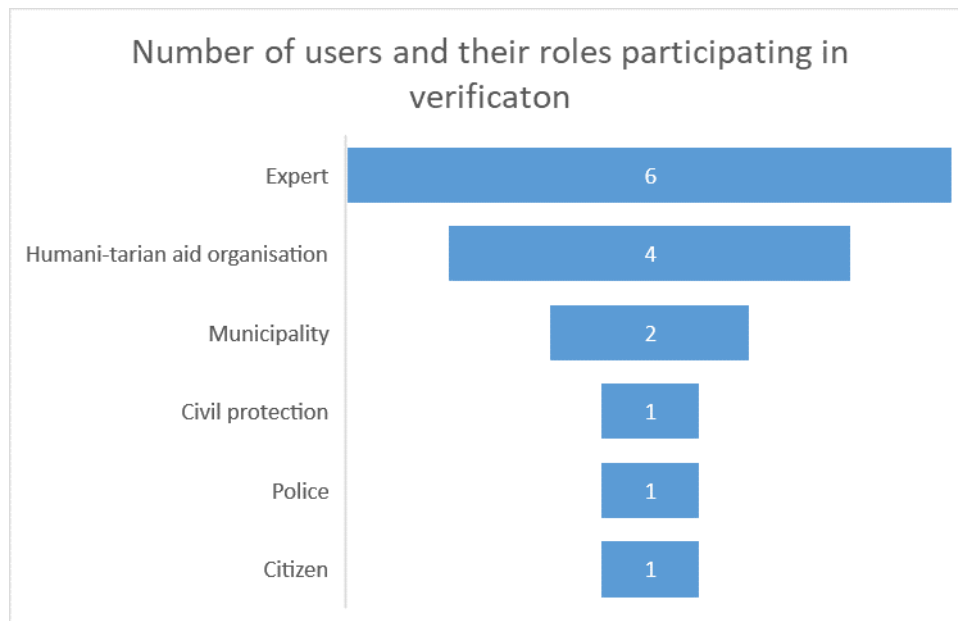


Figure 2: Number and types of RESILOC platform users involved in the verification exercise

All but three (3) participants completed the system usability questionnaire, leading to 12 completed questionnaires. In two trial sites (Community 2 and Community 3) a second set of usability responses were collected after the dry run workshop, completed by a set of overlapping though slightly different workshop participants. In the analysis below this second data set is only used where it adds meaningful trends or deviations from the first data set.

Verification participants' survey responses provide us with information about gender and level of self-assessed ICT skills. As Figure 3 below shows, approximately 40% (5) of verification participants were women, 60% were men (8).

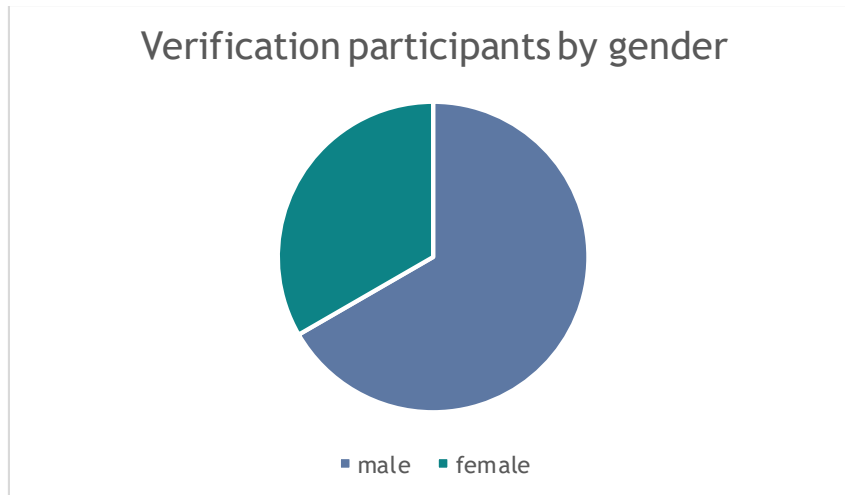


Figure 3: verification participants by gender

The 11 usability questionnaire respondents who answered the question had, overall, good ICT skills. The majority (8) classified their level of ICT skills as intermediate, and only one (1) person rated their skills as basic. Two (2) users had advanced skills and one preferred not to say. All users with advanced ICT skills were based in Community 1.

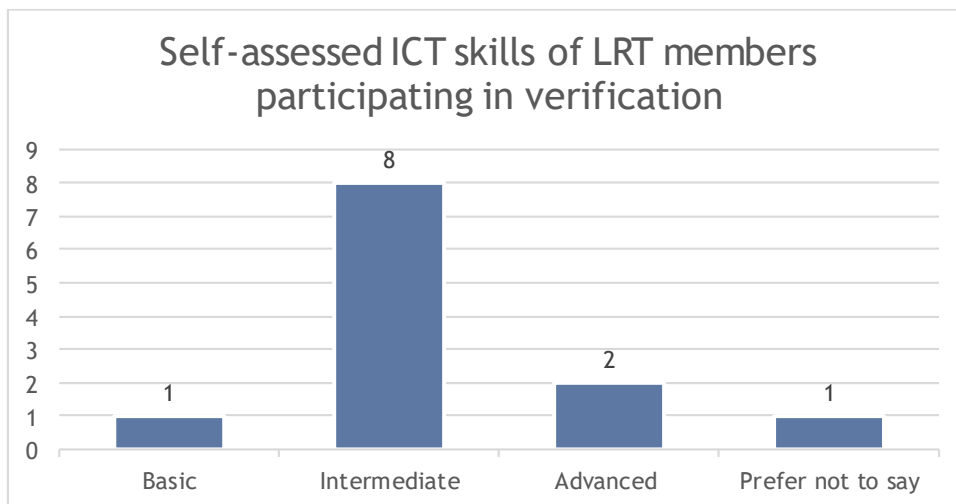


Figure 4: verification participants ICT skills

Whilst the small sample prevents a statistical analysis of the relevance of gender and ICT skills for the usability of the platforms, respondents represented a good spread in terms of these characteristics which allows for a qualitative exploration of potential implications for usability of the RESILOC platform. The next chapter discusses the results of the verification task. To preserve the anonymity of research participants, the name of communities has been anonymised throughout this report.

3 Verification results

This chapter presents the results of the verification work on the RESILOC platform. It is structured by key ISO software usability criteria and combines the results of the usability survey with qualitative work. We start off by discussing users’ satisfaction with the platform, then discuss perceptions on usability (including observations on accessibility), efficiency, effectiveness, user functionality and flexibility.

3.1 User satisfaction

According to ISO 9241, user satisfaction means “the comfort and acceptability of the work system to its users and other people affected by its use” (w3.org, 2002). We have covered this with several questions in the system usability scale (usefulness of the RESILOC platform, ease of use, and intended use) as well as observations and focus group discussions. The answers to these questions are analysed below.

3.1.1 Usefulness of the RESILOC platform

The system usability questionnaire invites users to share the extent to which they agree with the following statement: I think I would like to use this system frequently.

Eight (8) of the twelve (12) trial participants completing the questionnaire (strongly) agreed that they would like to use the RESILOC platform frequently. Three (3) verification participants were undecided and only one (1) respondent disagreed with the statement.

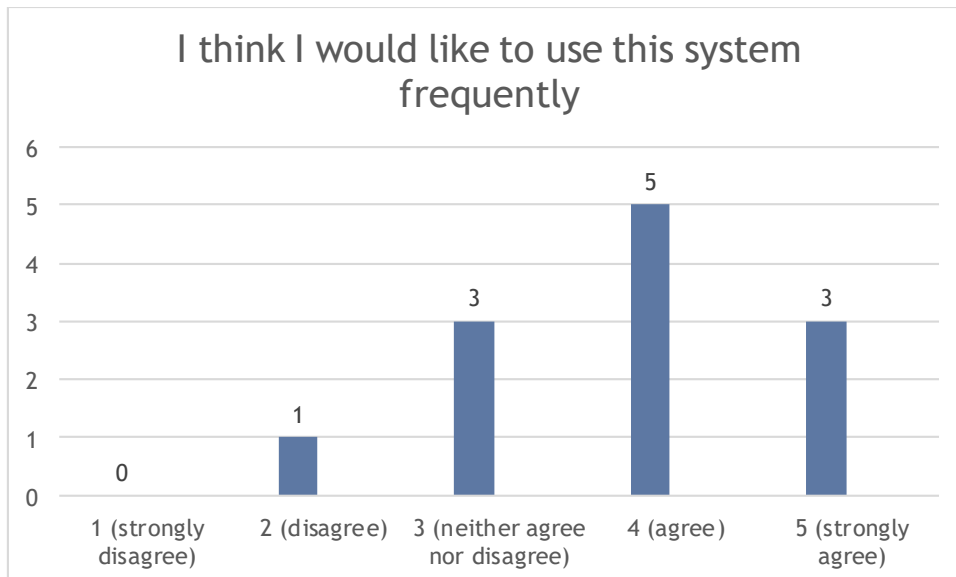


Figure 5: Using the RESILOC platform

Overall, therefore, those involved in the trials and the verification process thought the platform was useful and expressed an interest in using it in future.

3.1.2 Achieving objectives

This is, perhaps, also because users across all three communities seem to see a potential for benefits of the RESILOC platform for local resilience assessment, such as: adding value to local resilience assessment by pulling together relevant data and parameters as a basis for resilience work; providing an incentive to periodically measure local resilience; creating a basis for further analytical work. This is illustrated in the quotes below.



[The RESILOC platform] Gives the opportunity to pull together data that you need and parameters you need to understand the local situation and needs. In this way you can have some references and idea of what the situation is, and a basis to do resilience work that can have value.

Community 1 verification

Its ability to support and give local administrators the incentive to regularly and periodically measure or evaluate the resilience of their local communities. It is a tool that can support this because it can ‘take people by the hand’ and do this in a step-by-step way and in a way that is not resource-intensive or time-consuming. The platform gives you a method, and a practical tool to help you to do that, which is a nice thing – not only locally but also useful at all levels.

Community 3 verification

The assessments (the “diagrams at the end”) were identified as a basis on which huge analytical work can be done. If findings are analysed properly at the end of the process, there is a big chance this will lead to an increase in the local community resilience.

Community 2 verification

However, lack of data relating to some questions / proxies (Community 1), local capacity to use the system especially in smaller communities (Community 2 / Community 3) and the ability to access the platform in the first place will influence the extent to which users’ objectives can be achieved.

3.1.3 How easy it is to use the RESILOC platform

Two linked questions in the system usability scale explore ease of use:

- I thought the system was easy to use
- I found the system unnecessarily complex

Most people completing the usability questionnaire found the RESILOC platform easy to use: eight (8) out of the twelve (12) respondents (strongly) agreed with this statement; only three (3) respondents (strongly) disagreed, one person did not have an opinion. There was no clear pattern linking responses to level of ICT skills. Community 1 was the most positive site (all strongly agreed), Community 3 the most sceptical. In the latter, the average score for this item fell very slightly between the first and second administration of the usability survey (whereas that in Community 2 improved).

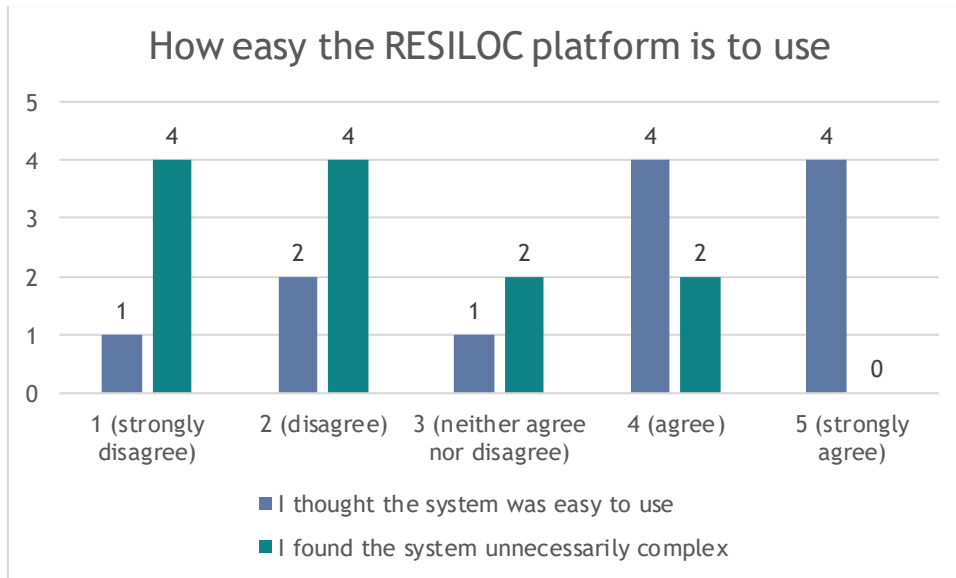


Figure 6: Ease of use of the RESILOC platform

Quotes from the verification workshops, as displayed below for two of the trial sites, support these answers.

It's simple to use, which also means it's enjoyable to use. It's not something that feels like a chore.

Community 1 verification

Creation of the profile etc is not complicated, it works well, and on the whole you can understand the functions of it quite quickly. And this ease is good particularly thinking of an average / simple 'citizen' as a user who might want to use the platform.

Community 3 verification

Figure 6 above also shows that responses given to the second item (how complex users thought the system was) essentially mirrored answers to the item on ease of use and suggest that users did not find the RESILOC platform particularly complex. Eight (8) out of twelve (12) respondents (strongly) disagreed with the statement that the RESILOC platform is unnecessarily complex. Two (2) users agreed, and two further users (2) did not have an opinion. No one strongly disagreed. Once more, users in Community 1 were the most supportive of the system (all strongly disagreeing that it was unnecessarily complex), followed by Community 3 and then Community 2 – though in the second round Community 2 users were more supportive than Community 3 ones.

3.1.4 Satisfaction with features

“A feature is a unit of software that provides a specific function or capability for the software” (senseittechtips, 2022). This section lists the features of the RESILOC platform that during verification were found to work well, were experienced as less user friendly and did not work well.

RESILOC platform features that were observed during the verification activities to work well included:

- Signing into the platform (Community 2 verification)
- Selecting the communities to follow, (Community 2 verification).
- Adding indicators and proxies



- Confirming proxy details
- Creating scenarios and setting their visibility (draft / restricted / public).

RESILOC platform features that were experienced as less user-friendly included minor ‘quirks’ in the coding of the platform (the first three points in the list below), as well as more substantial issues which are likely to affect the user’s experience of the system (the remaining four points in the list below):

- The proxy search field was experienced as not visible enough by some users (Community 2 verification)
- The process of adding a tag or category to proxy information which requires typing the tag and then selecting it through a click for the system to accept it) [Community 2 verification]
- The fact that the system returns an error message saying the name of the proxy cannot end with a blank space (Community 2 verification)
- The platform’s apparent lack of acceptance of Cyrillic letters in some fields which meant registration onto the platform took longer for some users than expected.
- Selecting ‘type of data’ (string / number) for a proxy that requires a yes/ no answer when the system only accepts numerical answers. (Community 2 verification)
- When creating a scenario, it is not intuitively clear which of the two options offered (‘modify scenario’; ‘insert objectives’) needs to be chosen (Community 3)
- Not having the scenario name displayed while carrying out edits on it (Community 2).

One feature did not work during the verification activity in one site: whilst users are able to create the obligatory categories for proxies, these were then not ‘used’ by the system meaning the potential benefits of this feature (e.g., to ease the visualisation during the process of selecting proxies) could not be realised.

The following improvement suggestions were made:

- Providing a default option for creating a scenario (rather than giving the user the choice of two options that are difficult to understand) (Community 3).
- Add a side scroll bar to the platform to make it easier to scroll up and down (Community 1). This was subsequently implemented.

3.1.5 Summary of results: user satisfaction

The table below presents a visual summary of users’ satisfaction with the RESILOC platform. Darker shades of teal represent stronger agreement or no / fewer issues detected.

User satisfaction with the RESILOC platform	
Usefulness Most users thought the RESILOC platform was useful and wanted to use it in future.	Achieving objectives Users spoke to the opportunities / potential the RESILOC platform for resilience assessment, though achieving this potential can be hampered by lack of data, capacity and platform availability.
Ease of use Most users found the RESILOC platform easy to use.	Satisfaction with features Several features were experienced as less user friendly, some of which are likely to affect users’ experience of the system negatively.



3.2 Usability of the RESILOC platform

Usability is the “capability of the software product to be understood, learned, used and provide visual appeal, under specified conditions of usage (...)” (Padayachee et al, 2010, p. 4-5). We have included four sub-criteria into our verification work:

- Understandability (does the user comprehend how to use the system easily?)
- Learnability (can the user learn to use the system easily?),
- Operability (can the user use the system without much effort?) and
- Attractiveness (does the interface look good?).

Data on this criterion comes from the system usability scale, the verification workshops, and RESILOC partner interviews.

3.2.1 Understandability

Two items in the system usability questionnaire relate to understandability, namely the set of items asking about users’ confidence to use the system (independently):

- I felt very confident using the system.
- I think that I would need the support of a technical person to be able to use this system.

Eight (8) respondents (strongly) agreed that they felt confident using the RESILOC platform. Confidence was highest in Community 1 (all users agreeing very strongly that they felt confident using the system). Here, users reflected in the verification workshop that the platform is ‘very intuitive’ and once the user works with the platform and understands the first step, subsequent steps are “not dissimilar”. Community 2 survey respondents displayed the second highest degree of confidence using the system (all users agreeing that they were confident using the system, with one user in the second survey neither agreeing nor disagreeing with the statement). Community 3 users showed the lowest level of confidence (2 disagreeing, 2 neutral, one agreeing).

There is no clear link between level of self-assessed ICT skills and confidence using the platform. One user with basic ICT skills agreed they felt confident using the RESILOC platform; another user with basic ICT skills disagreed. However, observation and focus group data point towards a link between frequency of use and confidence. Core LRT members in verification workshops who had had more practice using the system independently appeared to feel more confident than those with less hands-on use. This conclusion seems to be supported by findings on the learnability of the platform (see section 3.2.2 below).

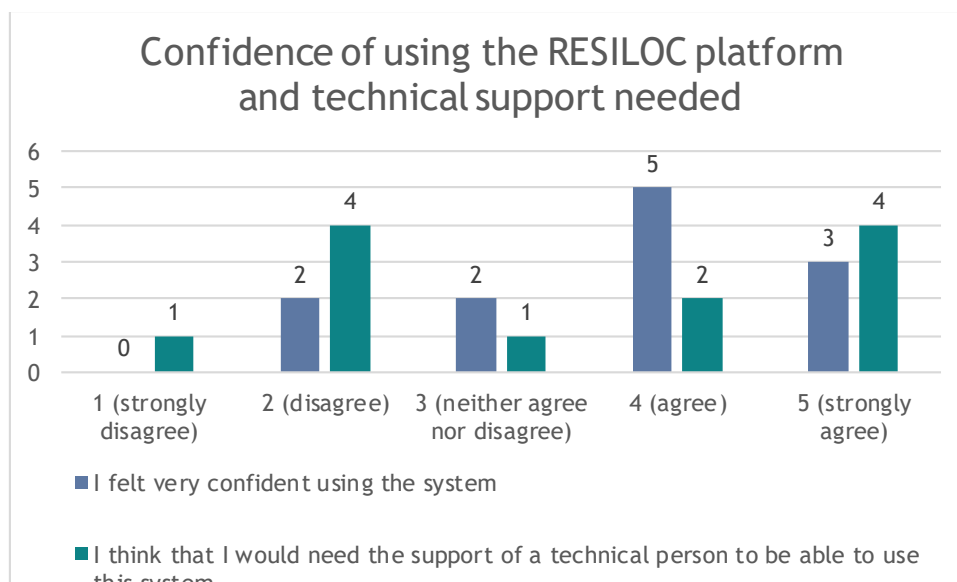


Figure 7: Confidence and technical support needs

Users were almost evenly split in their agreement / disagreement **with the need for technical support**. Five (5) respondents (strongly) disagreed with the statement that they needed the support of a technical person and they largely overlapped with those respondents who had also said they felt **confident** using the system. Six (6) people (strongly) agreed with the statement. Half of these also did not feel very confident about using the RESILOC platform or did not have an opinion, speaking further to the link about confidence with the system and perceived need for technical support. Three users, however, all in one verification site (Community 2) expressed both high confidence in using the platform and need for technical support – though this perception changed in the second survey when three out of four respondents did not feel the need for technical support, a trend we could also observe in the third trial site (Community 3). This trend seems to further support the conclusion that engagement with the platform increases user confidence and hence is learnable through use. This point is discussed in the next section.

3.2.2 Learnability of the RESILOC platform

Learnability of the RESILOC platform was explored both in the system usability questionnaire and in the verification workshops.

The questionnaire includes two questions specifically aimed at learnability of the platform:

- I needed to learn a lot of things before I could get going with this system
- I would imagine that most people would learn to use this system very quickly

The largest number of respondents (5 out of 12) neither agreed nor disagreed with the statement that they had to learn a lot before using the RESILOC platform. Very slightly more people (4), however, agreed than disagreed (3) with the statement that they had to learn a lot of things before they could use the platform. Neither agreement nor disagreement with the statement had a clear link to ICT skills or was clustered in a particular trial site. Average scores were moderately better in the second surveys and all users had, of course, undergone a training workshop of half a day as part of the RESILOC field trials. This would suggest that users have to undergo a learning curve before feeling confident with using the RESILOC platform. This is expressed in different ways in the two verification observations below.

The platform is very intuitive, particularly the interface/design; you get a sense quite quickly of what the icons and functions mean. This makes it generally very easy to use, which facilitates

the navigation. By working on the platform, experiencing it, you learn how to use it almost immediately. So once you do the first steps, and understand how it works, the rest is easy, you become autonomous quickly and it's straightforward.

Community 1 verification

At the technical level, the participants had the impression that they needed more time to get used to using the platform in order to perform tasks effortlessly, even though the platform is not too challenging a tool. It works in a dialogue regime, which is well known, and the text can be easily read. The opinion that at first glance the RESILOC platform seems a bit complex, but with time it becomes more comprehensible was confirmed.

Community 2 verification

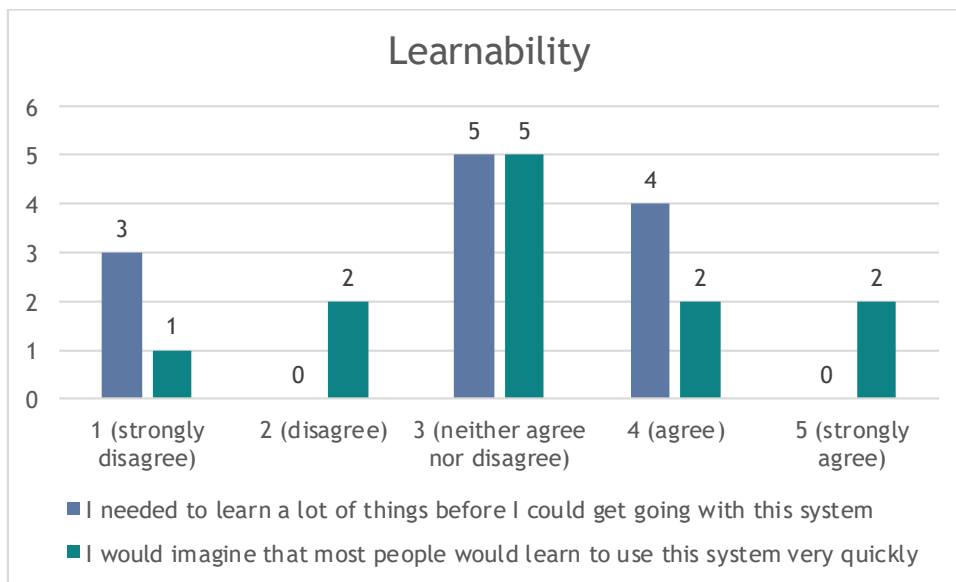


Figure 8: Learnability of the RESILOC platform

The pattern of responses was very similar when users were asked whether they would imagine that most people would learn to use this system very quickly. Like in the previous question, five (5) respondents neither agreed nor disagreed – three of these had also not expressed an opinion on their own learning. Interestingly, however, all users in Community 1 (strongly) agreed that most people would learn to use the system quickly (in line with the quote above). Once more, we can observe a softening of attitudes in those sites that completed the system usability questionnaire twice.

Answers to the learnability question (self and others) might have been influenced not merely by the experience of simple platform navigation, but by the experience of creating resilience assessments using information embedded in the platform. Thus, the verification workshop in one RESILOC community and an interview with lead partners from a second trial site both spoke to the same argument: the system includes highly technical language (in the form of indicators and proxies) which for non-technical expert audiences (e.g., citizens or operational staff in first responder organisations) will be difficult to grasp. Consequently, engaging with the platform would require a steep (if not impossible) learning curve for these types of users (especially if no advance training is provided).

Against this background, the need for a **training course** before using the platform and a manual was stressed by one community, whilst members of another felt that a **social support system** (an individual or a network) would be beneficial to support users when working with the system.



Perhaps one would need maybe not a training course per se, but something to support the process because a manual isn't enough, for example a person or a network that could be drawn on for sharing experiences and "take you by the hand" as you do something like this would be useful. We are all different people here, each with a specialism perhaps and so to do this type of evaluation of local resilience you might need others to help – from technical aspect to any other.

Community 3 verification

The verification workshops produced several suggestions on how the learnability of the RESILOC platform could be improved:

- Some **error messages**: only appear in English (and hence should be translated into all platform languages); appear as numerical codes rather than words affecting the user's ability to understand the nature of the problem; or invite the user to contact an administrator – a role that may or may not be present in the community working with the RESILOC platform (hence creating confusion). Moreover, "error messages do not tell you where the error is and when that happens it means you have to go and figure out where you've taken a wrong step. And say if you've spent a lot of time on it and you've done 8 steps you need to work out where the mistake is" [Community 3 verification interview].
- The platform does **not consistently indicate when it is taking time to process information**: the spinning wheel does not appear at every occasion when the system takes time to respond. At best, this leaves the user wondering whether the feature is working, at worst risking losing work from a crash if they continue to input information whilst the platform is 'thinking' (unknowing to the user).
- **Adding a legend** to define the meaning of the whole range of colours used in the final visualisation of a community's resilience assessment would improve the users' confidence in their ability to interpret the results.

The next section discusses operability and attractiveness of the RESILOC platform.

3.2.3 Operability and attractiveness

A further dimension of ease of use is how well the different parts of the RESILOC platform work together, i.e.: can the user use the system without much effort? The usability questionnaire captures this with the following two statements:

- I found the various functions in this system were well integrated.
- I thought there was too much inconsistency in this system.

Overall, respondents thought the functions of the RESILOC platform were well integrated: more respondents agreed (6) than disagreed (2) with the statement, though four (4) people – a third of respondents – did not have an opinion. Users in Community 1 were most positive (all agreed), average scores in the other two sites hovered around 3 (neither agreeing nor disagreeing) - with a tendency to slightly improve in the second-round survey.

Participants also shared that they felt anyone could use the platform, and that "it has everyt hing you need and where you need it" – it's not difficult to move from one part to the other or find the information you need.

Community 1 verification workshop

When asked to respond to the mirror statement to the above question (I thought there was too much inconsistency in this system), responses overall aligned with those of the first statement.



Five (5) respondents disagreed, three (3) agreed and four (4) – a third of respondents – did not have an opinion. Two respondents in two sites (Community 1 and Community 2) thought functions were both well integrated and there was inconsistency in the system.

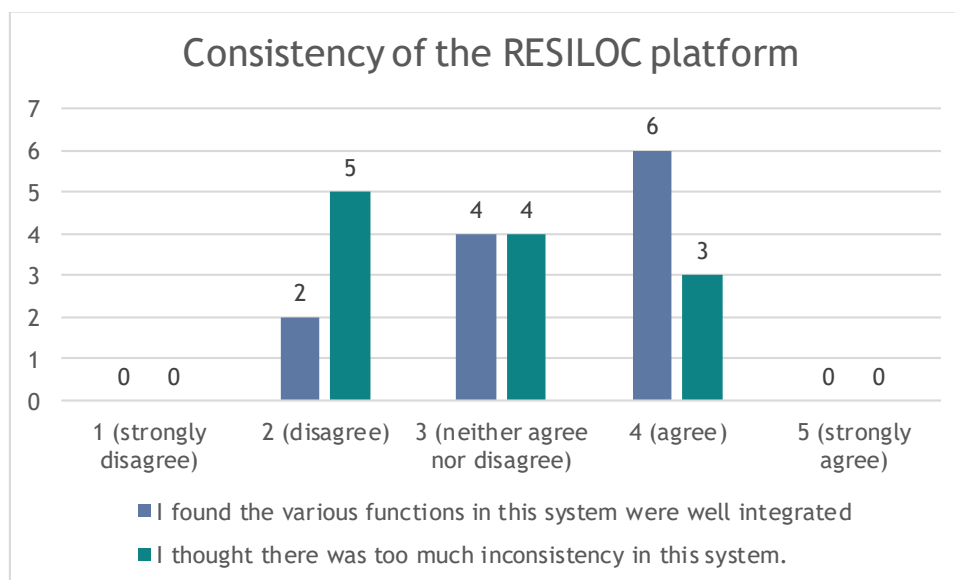


Figure 9: Consistency of the RESILOC platform

No issues were noted with the design of the platform, with users in one verification workshop saying that the platform was comfortable (ergonomically) and easy on the eyes / easy to read (Community 2). This is likely to be the result of the developers carrying out interface research at different stages of platform development and using icons, menus and 'assets' that users will be familiar with (e.g., a pencil icon to indicate editing functions). The final visualisation of the resilience assessment can be displayed both in colour (shades of green, amber and red) and density, allowing people who are red-green colour blind to make sense of the results picture – an important accessibility feature.

Beyond the integration of different functions in the system and its attractiveness, the verification workshops surfaced challenges relating to two operability aspects:

- The **configuration process**, where users with appropriate permission levels access RESILOC proxy, indicator and scenario lists and import relevant ones into their community (D4.6, p. 28).
- The **assessment process**, where users enter quantitative values to each proxy and define whether a proxy has a positive or negative contribution to community resilience in the given scenario (D4.6, p. 25).

Users experienced significant challenges in both workflows, as will be discussed in the sections below.

3.2.3.1 Configuration

Starting with the **configuration process**, the verification interview in one community (Community 3) directly highlighted the 'disconnect' between the resilience assessment framework elaborated in D3.1 RESILOC Resilience indicators and how this is represented on the RESILOC platform. Whilst D3.1 introduces a three-fold structure (resilience dimension, associated indicators, proxies associated with these indicators), the RESILOC platform abandons this clear framework and instead displays indicators and proxies as two long lists. It was suggested that conceptually, this creates confusion among users as the two systems do not line up. Working in the platform therefore creates uncertainty about how proxies, indicators



and dimensions connect. This led to a practice of designing and working with a spreadsheet replicating the DIP framework developed in D3.1 to select relevant indicators and proxies first. Then, in a second step, feeding the selected proxies and indicators into the platform using the search function. This process of selecting proxies and indicators was experienced as time-consuming and cumbersome. A greater conceptual / methodological alignment between the DIP framework and the RESILOC platform was therefore seen as highly desirable as a way of displaying indicators and proxies in a clearer order. This could, for example, be achieved by:

- Providing an indication which proxy is linked to which indicator in the “Proxies” menu, as well as which indicator is linked to which scenario in the “Indicators” menu.
- Offering the RESILOC resilience dimensions as entry points from which indicators and then proxies are displayed for selection / de-selection.
- At a minimum, creating additional user guidance explaining the RESILOC methodology and concepts and adding an up-to-date user manual

A further operability challenge came, for users in two RESILOC trial sites, from the fact that indicators and proxies only appear in English on the platform – unlike the navigation menu of the platform they are not translated into the three languages of the RESILOC communities (Bulgarian, Greek and Italian) [Community 3 and Community 2]. English proxies and indicators make the platform difficult to use for users with insufficient English language skills and hence require translation into local languages – adding time and effort to the process. Whilst since the verification task a translation feature was added⁷ initially the need for translation required the creation of new indicators and proxies in the local language.

The list of available proxies and indicators [on the platform] was not used as it is in English (...). All proxies and indicators were created as new ones and in [local language].

Community 2 verification

Beyond these challenges, users in another RESILOC community (Community 2) thought that selecting the right indicators also depended on having the correct expertise present in the community working with the platform.

A need for at least basic scientific knowledge to be present in the community was identified as a precondition for making (full) use of the platform. The reason for this is that without at least basic knowledge the community would not be able to identify the right proxies and indicators for itself.

Community 2 verification

Linked to this, the size of the community was thought to influence how usable the RESILOC platform is (Community 3 and Community 2). There was a view that smaller communities were likely to struggle to mobilise the financial and human resources to use the platform, and would also find most of the indicators irrelevant. This led to a recommendation for a modular approach following a geographical scale that includes both the country level and the smallest of communities.

(...) a tool like this – to reach its potential – should be made available to a network of local authorities of at least 15k inhabitants. This is because small communities have very few resources; they do not have the competence, or the time to dedicate to something like this which requires people with experience / ‘professional figures’ who are dedicated to a topic

⁷ The translation feature allows users to add the translation of an indicator or proxy directly into the platform by clicking the translation button near an English language indicator or proxy. This eliminates the need to create a new indicator or proxy when needing to work in a language other than English.



such as this. (...) So anything below 15k in terms of size / numbers of citizens means there just aren't the resources.

Community 3 verification

Specific usability issues related to the configuration process identified by the verification work were:

- The proxy search function works best with keyword searches. Typing the full proxy name means sometimes searchers yield no returns (Community 2 and Community 1)
- Some users found that searching proxies by category (categories tab) did not work (Community 2).

3.2.3.2 Resilience assessments

Regarding the **assessment process**, challenges were observed in the following areas: understanding how to assign values to the selected proxies, editing work and interpreting results.

The sophisticated nature of **assigning values** to proxies came out in different ways in all three trial sites. For one workshop participant (Community 1) this process was facilitated by their ability to draw on their professional knowledge (in terms of knowing where to find relevant data and understanding data requirements). Users in another site (Community 3) reflected on the implications of a lack of definitions of proxies and indicators on the platform for assigning values (see below) and indeed interpreting results.

For example, the proxy related to the existence of local training plans: the number assigned “surely must relate to whether there in fact are plans in place”, so [the workshop participant] queried what they were assigning values to – the existence of the plans, or just the importance of them (whether or not there were plans in place in reality).

Community 3 verification

Therefore, adding a **description of the proxies and indicators** to the platform was seen as helpful to give context and help with interpretation.

Users (Community 2 and Community 3) also grappled with the question on how to assign ‘type of data’ to a proxy that requires a yes / no answer (so inviting ‘string’ as the correct unit of measurement) when the RESILOC platform currently does not allow users to input qualitative scales (such as yes/no). So yes/no answers have to be converted to numbers (1/0). Possibly against the backdrop of similar experiences using the platform during the RESILOC field trials (though not picked up in the verification workshop), partners supporting another community (Community 3) felt that user guidance / additional tips on how to input data (e.g., turning yes / no answers into the numerical format required by the platform) as well as other key concepts (e.g., ‘relevance’) would be beneficial.

Verification work further delivered a sense that editing proxies (e.g., changing values, relevance or direction) after linking them to an indicator and a scenario is unnecessarily complex. Currently this requires deletion of the proxy and creation of a new one with the correct parameters. This limits the usability of the system – effectively it is not possible to correct mistakes as the user has to re-do their whole work on the proxy (even if only one aspect is to be changed). It is also not easy to ‘play around’ and see how a scenario looks like with different values). It was suggested that this be simplified, with editing possible without deleting the incorrect proxy. This suggestion was subsequently taken up by the developers who created a ‘duplication’ functionality which allows users to add or change a proxy’s value after performing an assessment.



Users were frustrated that no proxy details can be edited once a proxy is linked to an indicator. This is because a couple of participants wanted to edit the default number of measurements for some of their proxies and could not do it.

Community 2 verification

3.2.4 Summary of findings on usability

The table below summarises the findings on usability using colour coding. We have shaded learnability lighter than the other categories to reflect the fact that, whilst the platform is learnable, it does seem to require engagement with it to learn it at a minimum if not training or a user community to support use. We have shaded operability the lightest to reflect users' challenges with the indicators.

Usability of the RESILOC platform	
Understandability A majority of users felt confident using the platform though more than half thought they needed the support of a technical person.	Learnability Using the RESILOC platform requires a learning curve which may be more likely to be gotten over by people with relevant technical expertise.
Operability More users thought the functions of the RESILOC platform were well integrated than observed inconsistencies. Nevertheless, user experience was impacted by how relevant content is displayed on the platform and needs to be worked with.	Attractiveness Users thought the platform was well designed.

3.3 Efficiency

Efficiency is the “capability of the software product to provide desired performance, relative to the number of resources used, under stated conditions” (Padayachee et al, 2010, pp 4-5). We have included two sub-characteristics in this criterion:

- Unnecessary actions: unnecessary steps a user has to take to accomplish their task (smashingmagazine 2016).
- Time behaviour: how quickly the system responds (Padayachee et al, 2010, pp 4-5).

3.3.1 Unnecessary actions

The system usability scale asks users how cumbersome they find the system to use. The answers users gave are shown in Figure 10 below.

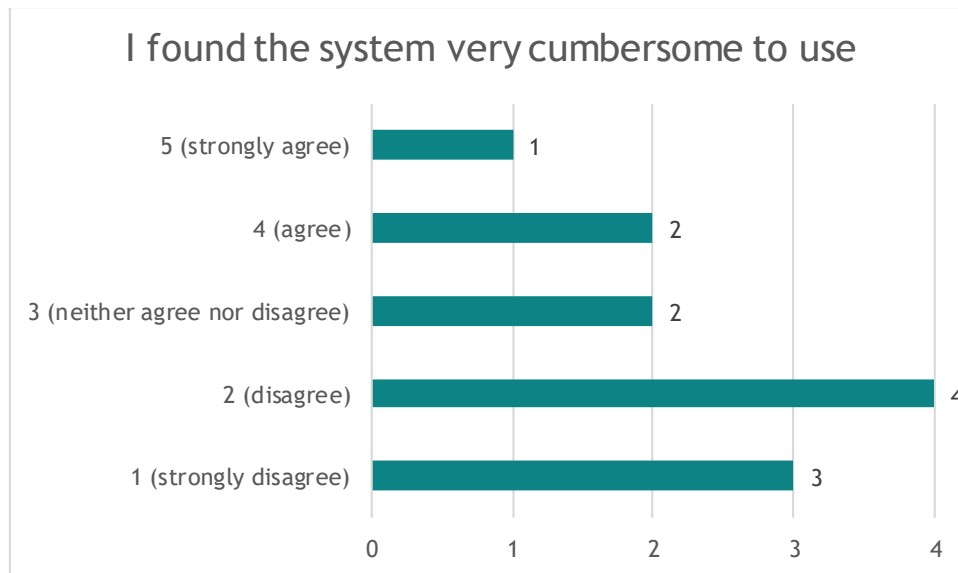


Figure 10: How cumbersome users find the RESILOC platform

More than half of respondents (7 out of 12, 58%) (strongly) disagreed that they found the system cumbersome to use. Three (3) respondents (strongly) agreed and two (2) did not have an opinion. All users in Community 1 (strongly) disagreed with this statement – the most positive site. This was followed by Community 3 where all but one user disagreed or were neutral. Community 2 results were most sceptical: two (2) users (strongly) agreed that they found the RESILOC system very cumbersome, one was neutral and one disagreed. In both communities, attitudes were slightly more positive when completing the survey second time round, with average scores slightly improving.

Even though most users participating in the verification work did not appear to find the RESILOC platform cumbersome to use, the workshops identified two key areas of ‘unnecessary actions’ which were a source of frustration for users in two trial sites (Community 2 and Community 3): the emerging practice of working with both a spreadsheet and the platform to select proxies and assign values; the requirement to use the search function to find relevant proxies on the platform. Both challenges are described below.

The RESILOC platform includes 260 proxies that appear as one long unsorted list and are not linked either to an indicator nor a RESILOC resilience dimension. This made it challenging for users across all verification sites to exclusively work in the platform. Whilst disconnecting the proxies from the indicators and dimensions was a strategic choice by RESILOC partners in the process of creating the platform to enable flexible and context-sensitive use of the proxies across indicators / dimensions, data from the verification task suggest that users would value greater – conceptual – certainty than is currently offered on the platform.

To help them complete the proxy selection task, users in all trial sites were therefore supplied by RESILOC partners leading the community trials with a spreadsheet displaying the RESILOC framework: including all proxies linked to indicators and RESILOC resilience dimensions. This spreadsheet was used to: translate proxies and indicators (see previous section); help select the ‘correct’ proxies; complete the whole task (proxy selection, definition of direction and values) before feeding the information into the platform (note this also helped users work with the system before proxies had been translated into community languages on the system). Users appeared to respond differently to working in this way: all vignettes below deliver a sense that working with two systems was a necessity during the trials to compensate for limitations of the RESILOC platform. Responses to this duplication of effort varied, however,



from manageable (due to sharing the workload) to frustration (due to cumbersome-ness and time needed).

(Yes, there is some issue here because they are mixed, in the sense that you are not immediately sure which indicator relates to which proxy as they are not ordered in any particular way so you can spend time fiddling around with that until you find the right one. But we divided that task between the three of us so it didn't create much of a problem.

Community 1 verification

Trial leads showed participants the Excel sheet to show them the dimensions / indicators / proxies – because this framework is not on the platform, going back and forth from the excel to the platform in order to populate it, makes it cumbersome and time consuming to use.

Community 3 verification

A supporting document (shared Google Sheets excel sheet) was used – in it, all proxies and indicators which were selected during the previous stages of the Capacity Building phase of the trial as such that are relevant and feasible for the community of Community 2. The participants used the document as a source from which they could copy and paste information in [local language], so as not to lose time to manually input text in the fields required by the RESILOC platform.

Community 2 verification

The lack of a systematic ordering of the proxies on the platform also requires users to use the search function each time they want to select a proxy on the platform using key word search as the system returns unreliable results when searching by exact wording of the proxy. To reduce the number of actions required to select a proxy, a suggestion from one of the verification workshops was to create select / de-select options for proxies and linking them more clearly to the dimensions.

The framework itself could map onto the platform in some way. For example, the Economic Dimension that shows the indicators, a function where I can select and then de-flag ones I do not need (...) but crucially that are already given to me and that follow some form of order – e.g., like the framework. I can start from Governance Dimension, Social, and so on.

Community 3 verification

It is noteworthy that these two aspects of the RESILOC platform do not appear to have found a stronger resonance in users' answers to the cumbersome question discussed above. It is likely that there are two main explanations for this:

- First, how users organise themselves around populating a scenario with relevant proxies affects their user experience. If the search for proxies is shared by several team members, as happened in one of the trial communities, it may be experienced as less time consuming than one (or two) people taking on the task.
- Second, RESILOC partners from two of the communities are likely to have taken on the bulk of the work needed to feed proxies into the platform, therefore 'shielding' core LRT members from this work.

3.3.2 Time behaviour

The speed of the RESILOC platform's response changed significantly over the course of the trials and hence verification work. Whilst slow response and crashes were issues experienced by users in the earlier verification activities and caused frustration, a subsequent increase in



server capacity by the developers largely resolved this issue and it was not something that was picked up in later verification activities

The web-based interface of the system was recognized as a big advantage. All participants were very satisfied with the fact that all of them were working in parallel with the platform and it did not “freeze” at any moment.

Community 2 verification

Two responsiveness challenges nevertheless came up in one of the verification communities. First, a lag remains in the platform response to certain actions which means work can get lost. This includes selecting multiple proxies for a scenario (at the same time) which, despite the platform interface suggesting the opposite, may not have been successfully imported. If the user does not double check that indeed all proxies have been ‘attached’ to the scenario and continues with the next step – adding values to the proxies – the only way to add the missing proxies is to delete all the work and start from scratch.

Second, the system can be too quick to respond to input, leading to incomplete answers being memorised and requiring the user to input it again. This was observed as a phenomenon when assigning values to the proxies.

So when you enter values to the proxies, for example or relevance and direction. The relevance is 100 and then the direction is positive. I click first on the positive direction and then I input 100. But between the two zeros I take too long to enter the second zero and the system already memorizes the 10 that I’ve put in and not the 100, and I need to put it again.

Community 2 verification

Adding an ‘OK’ button to verify the input was mentioned as one solution to address this problem.

3.3.3 Summary of findings on efficiency

The colour coded table below summarises the findings on efficiency of the RESILOC platform.

Efficiency of the RESILOC platform	
<p>Unnecessary actions Users required a separate spreadsheet rather than working exclusively in the platform and needed to transfer information onto the platform via a search function. Both practices affected user experience.</p>	<p>Time behaviour Following user feedback, initial problems with platform crashes were resolved by increasing server capacity. Occasional issues with too slow or too fast response remained while the verification work was carried out.</p>

3.4 Effectiveness and user functionality

This section combines findings relating to the extent to which the RESILOC platform enables users to accurately complete tasks.⁸ We have included three sub-criteria in our analysis of effectiveness and user functionality:

⁸ According to ISO 9241, effectiveness is “the accuracy and completeness with which specified users can achieve specified goals in particular environments”(see: <https://www.w3.org/2002/Talks/0104-usabilityprocess/slide3-0.html>). Functionality is the “The capability of the software to provide functions



- Whether tasks can be completed as required;
- What, if any, errors the system produces and how accurate / in line with expectations the result is.

These are discussed in the next sections.

3.4.1 Completing tasks

During the pre-dry run workshops to which the verification work was attached, users were required to navigate across the RESILOC platform to build a resilience assessment for a given scenario. Tasks including signing into the platform, selecting the community, confirming proxy details, creating new scenarios, selecting indicators and their visibility for a new scenario could all be completed without difficulties (Community 2 and Community 1 workshops).

A few other tasks were more difficult to complete during the verification exercise. Assigning relevance and direction to a proxy can only be done if all fields in the proxy definition have been completed – the platform does not allow the user to progress before this is accomplished. During the verification work the platform had sometimes not memorised all of the input or was not responding as server capacity had not yet been upgraded. This meant users could not complete their task on the platform and had to work in the accompanying spreadsheet instead (Community 1). Users also noted that the search procedure sometimes does not return results and requires several attempts to do so.

I also noticed for a moment that it took them some time to find the indicators/proxies they were after to show me as an example. They used the search function, but couldn't find it.

Community 1 verification

Finally, users in two sites (Community 1 and Community 4) noticed that the platform does not accept values collected for a proxy that are lower than the minimum target set. Users need to find a pragmatic solution around this in order to complete their assessment, e.g. in Community 1 they entered the value of the proxy as the minimum target as this will allow the system to calculate the indicator whilst also flagging the proxy as 'extremely low' and may alert the user to the fact that the value may in fact be even lower than the minimum value entered.

3.4.2 Accuracy and errors

Once a community has chosen and defined value and direction for all relevant proxies, the platform uses this information to produce a resilience assessment in the form of a circular diagram which uses colour coding (or density) to highlight stronger and weaker resilience aspects of the community.

During the verification interview with one community (Community 2) it was pointed out that this visualisation can sometimes display colour coding incorrectly. Where there is only one proxy attached to one indicator it can happen that even though the proxy is displayed in red (meaning something is not right) the indicator is displayed in green (meaning it's OK). In the case where there is only one proxy aligned with one indicator, the two colours should align suggesting an error in the platform where this is not the case. Following this user feedback, this error was subsequently corrected by the developers.

which meet the stated and implied needs of users under specified conditions of usage (what the software does to meet needs) (see: Padayachee et al, 2010, p. 4)



In addition, during the indicator / proxy selection for a scenario it can happen that if two indicators / proxies with the same name have been included in a scenario, and the user attempts to remove one of them, a random other indicator / proxy gets removed (not the one the user chose). Unless this is noted, this error has implications for the accuracy of the resilience assessment.

3.4.3 Summary of effectiveness

The table below summarises verification results on effectiveness and user functionality. Two of the four issues listed above were subsequently resolved, hence effectiveness not achieving the darkest shading available.

Effectiveness and user functionality of the RESILOC platform	
Completing tasks Tasks could mostly be completed though occasionally pragmatic solutions are required to work around the logic of the platform's algorithm.	Accuracy and errors Occasional error in results visualisation (since corrected) and indicator deletion was noticed.

3.5 Flexibility

Flexibility is an ISO/IEC 25022 criterion which assesses “the degree to which a product or system can be used with acceptable levels of effectiveness, efficiency, satisfaction, and freedom from risk in **contexts beyond those initially specified** in the requirements for this system. **Flexibility** enables products to take account of circumstances, opportunities, and individual preferences that might not have been anticipated in advance” (Norman and Kirakowski, 2018, pp 61-62).

RESILOC focuses on natural disasters, and during the trials the platform was used to create resilience assessments for snow, flooding, wildfires and the pandemic. To ascertain users' perceptions on how transferable the platform is perceived to be across disaster scenarios, we added a question into the system usability questionnaire: I think the system is more useful for some emergency scenarios than for others. Figure 11 below shows the spread of responses to this question.

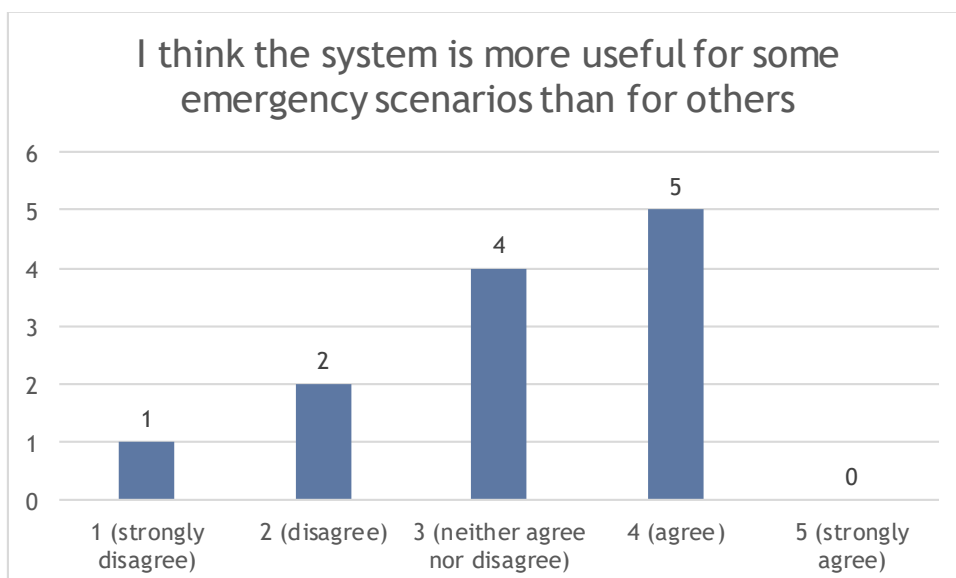




Figure 11: Usability of the RESILOC platform across emergency scenarios

More users (5) agreed with this statement than disagreed (3), while four (4) people were unsure. Despite users’ somewhat muted assessment of how transferrable the RESILOC platform is across emergency scenarios, it does have several features that allow it in principle to be used beyond the initial emergency and geographic contexts specified in RESILOC. These include:

- Availability of the platform navigation tools in four languages (English, Italian, Bulgarian, Greek) plus a translation button attached to each indicator and proxy allowing it to be converted into any language. This facilitates use in communities outside the four RESILOC trial communities within and outside the three countries involved in RESILOC.
- Each community can select and add their own proxies, allowing the tool to be tailored to specific local circumstances.
- Each community sets their own values for the proxies selected, allowing them to reflect local plans and strategies.

However, there was a view in two of the trial sites (Community 2 and Community 3) participating in verification that the RESILOC platform is likely to be less easily usable in small communities than in larger ones (see also section 3.2.3). Smaller communities are likely to have too few resources (people, money, time, skills) to use the RESILOC platform. Many indicators will also not be relevant, leading to the suggestion to chunk up indicators by community size with fewer indicators available for smaller communities.

According to the participants, the platform’s “universal approach” to all communities, despite their scale, is something that needs to be changed. According to one participant, the proxies and indicators are too universal to be useful (...); in their opinion, a modular approach would be better fitting (following a geographical scale that includes both the country level and the smallest of communities).

Community 2 verification

Finally, even though the platform contains information from all communities using it, there is no feature that allows users to compare their community to others (e.g., in proxy choice or resilience assessment).

The table below summarises the flexibility criterion with the help of colour coding.

Flexibility of the RESILOC platform
<p>Flexibility</p> <p>Whilst platform design allows for use in different country and emergency scenario contexts, lack of indicator translation and community size will impact where and how it is used.</p>



4 Conclusions

The previous chapter has presented the results of the verification activities on the RESILOC platform. Taking a usability study approach, the purpose of the verification task was to assess the extent to which the RESILOC platform from a technology perspective meets users' needs and requirements.

The set of verification activities implemented provided rich, and occasionally, contradictory quantitative and qualitative data and recommendations for improvement. At least in part, this is likely to come from the challenge of separating pure navigation of the platform from using it to accomplish the 'primary task' it was created for: to carry out community resilience assessments. This might, however, also be due to the support received by users from RESILOC partners during the verification and trials – which may have influenced quantitative scores without a chance to be acknowledged explicitly as an influencing factor.

On balance, users thought that as a piece of technology the RESILOC platform was easy (rather than cumbersome) to use and well-designed, hence clearly benefitting from the user interface research the developers carried out as they were building the platform. The different functions were thought to be well-integrated with very few people thinking there were inconsistencies. Importantly, users also thought the RESILOC platform could be useful: the majority would like to use the system frequently. If all required data is available locally and capacity exists to use the system properly, users believed it can provide the basis for valuable resilience work at local level: bringing together data, enabling analysis and incentivising period measurement. Some key usability issues (platform crashes, the error in the visualisation of the indicators / proxies identified in one community) were fixed by the developers in response to user feedback improving usability and confidence in results.

Whilst as a piece of technology the platform is well designed, the verification work suggests that there is a learning curve attached to using it. This could be linked to the fact that some navigation / action options and error messages are not easily understood by users (hence require experimentation or support) and / or that some of the process updates (e.g. , processing time) are inconsistent.

The judgement of a learning curve is also likely to come from the experience of using the platform to configure resilience scenarios and assessments which, because of the unstructured display of indicators and proxies and a perception of technical language, was experienced as challenging. Indeed, how indicators and proxies are organised on the platform was one of the key issues raised during the verification work. Whilst the lack of structure in how the indicators appear was a conscious design choice (meaning proxies and their targets could be used and set flexibly across RESILOC indicators and dimensions), in practice this created a lot of uncertainty among users in how to work with the platform and required supplementary tools to be created. The need to translate the indicators into local languages before or during the configuration process and the lack of a definition of the indicators and proxies on the platform further affect perceptions of the usability of the platform. These issues required the 'unnecessary action' of working with two systems in parallel: a spreadsheet and the RESILOC platform – something that was experienced as time and labour intensive and a source of frustration for some users. Adding further user support such as integrating information on the RESILOC methodology and a manual into the platform and building a social support system (individual or network of users) were key recommendations.

Whilst some of the issues identified during the trials and verification work were subsequently fixed by the developers, others are more likely to provide inspiration for a v2.0 of the platform. These include: thinking about the display of indicators and proxies in the system, making the


resilience diagram visible as work on the platform is going on, improving comparability between communities.

All in all, therefore, the results from the verification work are aligned with the project’s vision that the RESILOC tool was about resilience strategy, hence requiring a suitably qualified, experienced and trained group of people to use it. Going forward, the question that needs to be worked with is to what extent the RESILOC platform should be explicitly communicated as one necessary but not standalone (technical) part of a system for assessing community resilience that also requires significant input by relevant people (ie a social system) to ensure its proper working.

<p>Usefulness Most users thought the RESILOC platform was useful and wanted to use it in future.</p>	<p>Achieving objectives Users spoke to the opportunities / potential the RESILOC platform for resilience assessment, though achieving this potential can be hampered by lack of data, capacity and platform availability.</p>
<p>Ease of use Most users found the ESILOC platform easy to use.</p>	<p>Satisfaction with features Several features were experienced as less user friendly, some of which are likely to affect users’ experience of the system negatively.</p>
<p>Understandability A majority of users felt confident using the platform though more than half thought they needed the support of a technical person.</p>	<p>Learnability Using the RESILOC platform requires a learning curve which may more likely to be gotten over by people with relevant technical expertise.</p>
<p>Operability More users thought the functions of the RESILOC platform were well integrated than observed inconsistencies. Nevertheless, user experience is impacted by how relevant content is displayed on the platform and needs to be worked with.</p>	<p>Attractiveness Users thought the platform was well designed.</p>
<p>Unnecessary actions Users required a separate spreadsheet rather than working exclusively in the platform and needed to transfer information onto the platform via a search function. Both practices affected user experience.</p>	<p>Time behaviour Following user feedback, initial problems with platform crashes were resolved by increasing server capacity. Occasional issues with too slow or too fast response remained while the verification work was carried out.</p>
<p>Completing tasks Tasks could mostly be completed though occasionally pragmatic solutions are required to work around the logic of the platform’s algorithm.</p>	<p>Accuracy and errors Occasional error in results visualisation (since corrected) and indicator deletion was noticed.</p>
<p>Flexibility Whilst platform design allows for use in different country and emergency scenario contexts, lack of indicator translation and community size will impact where and how it is used.</p>	

Table 1: Summary of verification results by category

VII. Appendix A: RESILOC ethics self-assessment sheet

RESILOC		RESILOC ethics self-assessment sheet					
This document is a self-assessment sheet that must be filled out by owners of RESILOC deliverables. This is to ensure that research and/or development activities related to each project deliverable comply with requirements of RESILOC Guidelines on Ethics and Data Protection (GDPR).							
This RESILOC ethics self-assessment sheet must be used as part of each project deliverable that involves humans either in an active (e.g. data subjects) or passive (e.g. affected by tools) manner. Project reports (e.g. management or financial reports) are not required to undergo this ethics assessment.							
This document is an important exercise part of the RESILOC Ethics Framework as it allows the owner of each RESILOC deliverable to reflect on ethical consideration and data protection requirements in a structured and approved manner before submitting the document to the Commission for review.							
The document shall be used in line with the RESILOC Ethics Framework including the guidelines and procedures under deliverables D9.1 to D9.12 (all documents are made available on the RESILOC Own Cloud). The ethics self-assessment sheet must be included as the 1st Appendix A of the each RESILOC deliverable. In addition to filling out the sheet, authors must provide explanations of the answers given on the main table. Such explanations must be provided in the methodology section of the deliverable using the headline "Ethics Considerations and Data Protection". The ethics self-assessment sheets of private deliverables must be assessed through the responsible position within the issuing organisation. However, for public deliverables, the ethics self-assessment sheet must be approved by the RESILOC Internal Ethics Board. For that, please send this document to the Internal Ethics Board.							
For information or assistance contact:				helena.marruecos@iml.fraunhofer.de			
The self-assessment was conducted by:				The self-assessment was approved by:			
Name	Kerstin		Name	Nadejda			
Surname	Junge		Surname	Miteva			
Institution	TIHR		Institution	BILSP			
Date	14.8.2022		Date	15.9.2022			
					yes	no	n/a
G	GENERAL						
a	Did the research for this deliverable involve the collection of personal data?				x		
b	Does this deliverable, and the activities that have fed into it, comply with Regulation (EU) 2016/679 known as GDPR and 2002/58/EC Directive on privacy and electronic communications?				x		
c	Does this deliverable, and the activities that have fed into it, comply with the relevant national data protection and privacy laws, codes of practice and guidelines?				x		
d	Are there any ethics risk identified related to your work under this deliverable?					x	
1	Human Participation/ Informed Consent						
1.1	Procedures and criteria that will be used to identify/recruit research participants (D9.1)						
a	Did the research for this deliverable involve the recruitment of research participants? (<i>this includes surveys and interviews</i>)				x		
b	Did you identify selection, inclusion, & exclusion criteria?				x		
1.2	Recruitment of respondents via social media (D9.4)						
b	Were special measures taken to ensure that the participants are adults?						x



c	Did the research for this deliverable involve data collection using social media?					
d	Were measures taken to use only public profiles for the collection of data?					
		yes	no		yes	no n/a
1.3	Use of the informed consent forms and Info sheets to recruit research participants (D9.2)					
a	Consent Form was issued			Issued in local language		
b	Information sheet was issued					
c	Combined sheet was issued	x			x	
1.4	Use of the informed consent forms and information sheets on data processing (D9.9)					
a	Consent Form was issued			Issued in local language		
b	Information sheet was issued					
c	Combined sheet was issued	x			x	
2	Organizational measures					
2.1	Data Protection Officer or contact person (D9.5)					
a	Do you have a Data Protection Officer or contact person for participants?				x	
b	Was this contact mentioned on the Informed Consent Forms?				x	
3	Technical measures					
3.1	Technical safeguard mechanisms for handling of personal data (PD) and special categories of personal data (SCOPD) (D9.6 / D9.8) (SCOPD include information such as ethnic origin, political opinions, data concerning health, etc. For more details see Article 9(1) GDPR).					
a	Did the research for this deliverable involve the collection of SCOPD? (D9.6)					x
b	Which mechanisms were used to safeguard the personal data collected?					
	pseudonymisation	x		anonymization		
	encryption			other (specify in the line below)		
	access restriction	x				
3.2	Data minimisation (D9.7)					
a	Has as little as possible data been collected throughout the research process?				x	
b	If more data was collected than initially needed, did you ensure the data was deleted?					x
3.3	Data profiling (D9.10)					
a	Was or will the data collected in the deliverable be used for data profiling?					
b	Were all data subjects informed of the profiling and its possible consequences? (as part of the Inform Consent Form and the Information Sheet)					
c	Were sufficient measures in place to safeguard their fundamental rights?					
3.4	Processing of previously collected personal data (D9.11)					
a	Did you obtain consent to use personal data from previously executed research?					
b	Are technical/organisational measures required to safeguard the rights and freedoms of the data subject according to EU and national legislation in place in your organisation?					
4	Other Issues of ethical concern					
a	Were there any other ethical considerations detected during the work of this deliverable that are not covered by the list above?				x	
b	If yes, please list the concerns below and elaborate on the related counter measures in the methodology section of this document					



B cont.	The small number of participants and communities in the verification exercise creates a potential risk to identify research participants. The decision has therefore been taken to pseudonymise the communities involved in this research.								
5	Opinions/approvals provided by ethics committees and other experts								
5.1	Following documents received opinions/approvals provided by ethics committees and other experts for the research conducted for this deliverable.								
			yes	no			yes	no	n/a
a	Informed Consent Forms and Information sheet	IEB	x		EEA				
		DPO			LEB				
b	Questionnaires / Surveys	IEB	x		EEA				
		DPO			LEB				
c	Design /Methodology of research activity	IEB	x		EEA				
		DPO			LEB				



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