CATALOGUE OF REQUIREMENTS FOR THE WEB BASED EXPERT PLATFORM

Deliverable: D.T1.2.2	Final
Project partner: PP10-GiGa	04 2017

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Date of publishing 20.04.2017

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1. Introduction

The project related web platform www.geoplasma-ce.eu represents the major technical output of the project GeoPLASMA-CE. According to the application form of the project, it will consist of two main tools:

- The web based decision support and information tool based on 3D models addressing the 6 pilot areas (Output O.T1.1).
  "The web based tools will provide geoscientific key values which help to plan shallow geothermal use in the selected pilot areas in a sustainable way (TWP3). All needed information will be geographically referenced and displayed in terms of maps and cross sections, which are planned to be interactively extracted by users from 3D models. The web tools will give all relevant information to users in order to plan and monitor the use of shallow geothermal methods." (Taken from the AF, description of O.T1.1).
- The web based expert platform addressing also stakeholders outside the pilot areas (O.T1.2).
  "This output acts as an interface between experts from public authorities, private market (e.g. planners of geothermal use or energy suppliers), interest groups (e.g. federations) and the scientific community. It intends to address both, stakeholders from pilot areas and other regions of Central Europe and beyond. It will contain all outcomes concerning harmonized workflows and standards (TWP2), the upscaled energy planning strategies (TWP4) and general communication tools like yellow pages." (Taken from the AF, description of O.T1.2).

As the web portal will serve as an interface between the project outcomes and end-users in both, the 6 different pilot areas and the Central Europe region, a stakeholder survey has been performed (A.T1.1 & A.T1.2). The analyzed outputs of the WPT1 survey are presented in this report with respect to the user requirements for a web expert platform (output O.T1.2). The user requirements represent a ranked list of aimed features, which will then be evaluated for a possible realization within the project lifetime with regard to the available resources. The evaluation process will finally lead to a so called White Book of the web based expert platform (deliverable D.T1.4.1), which represents the basis of the technical realization of output O.T1.2.

2. Stakeholder survey

2.1. Content of survey

The design of the survey is described in deliverable D.T1.2.1 ("Template of a harmonized questionnaire for the web based decision support and information tool and the web based expert platform"). The harmonized questionnaire is based on a mind-map scheme, which covers all technical aspects of the web portal, like data dissemination features (e.g. web maps, web databases or 3D models), social functionalities (e.g. yellow pages) and general aspects (mobility, data formats and data security). The first draft of the questionnaire still considered two independent surveys for the outputs O.T1.1. and O.T1.2. However, as some aspects as well as the stakeholders of the surveys were significantly overlapping, the project team decided to combine the initially two separate surveys into one single survey. The survey itself was performed online using the tool QuestionPro (www.questionpro.com). The survey was disseminated via the project related microsite, the websites of the involved project partners and via E-Mail invitation including the hyperlink to the survey. In order to reach local stakeholders in the pilot areas, the final version of the questionnaire was translated into German-, Polish-, Czech-, Slovenian and Slovak language.

2.2. Outcome of survey

The GeoPLASMA-CE platform survey, containing up to 61 questions, was open from 16th December until 17th February. During this time span it was viewed 557 times. It was started 203 times and completed 86 times,

which results in a completion rate of 42.36%. People from 10 countries completed the survey. The countries with the most participants are Germany (33%), Austria (21%) and Poland (20%). Figure 1 shows an overview about the participants of the survey grouped into country of origin, years of experience in the field of geothermal energy and professional occupation respectively.

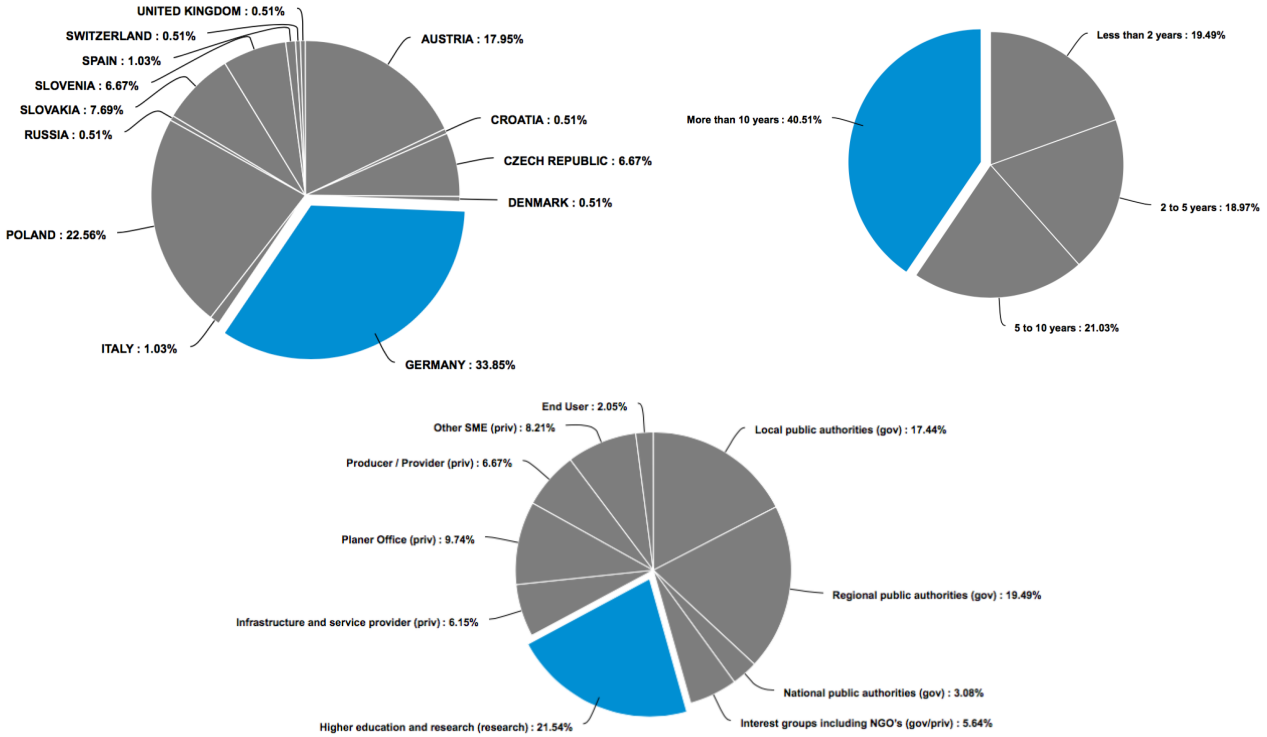

Fig. 1 – Overview of the participants of the survey grouped by country of origin (top left), years of experience in the field of geothermal energy (top right) and professional occupation (lower middle).

2.3. Statistical analysis of received feedback

To analyze the results of the survey, a combination of Excel and the programming language "R" (R Development Core Team, 2008) was used. Only the results of the 86 completed surveys were taken into account. The incomplete answers were ignored to assure that possible duplicate answers of a participant who started the survey once and completed it another time are not a factor in the analysis.

To get an overview of the results before defining specific groups of users, the first step was to analyse the answers of all participants, regardless of their experience, their profession or their location. The raw data of every question was exported from the online platform and a stacked bar chart was created with R. All charts that have been created are shown in the Annex. The stacked bar charts are a good way to visualize the relevance of a single feature to the participants (Fig. 2).

Simultaneously to the creation of the bar charts, a flow chart was created to visualise the connection between single questions of the survey. The color scale of the bar charts was used to colorize the flow chart in a next step. The result of this was a visualization that gives a good summary about the relevance of the features for the participants. For the colorization of the flow chart the different scales of the bar charts had to be unified to a single scale of relevance with different shades of green representing a „high - low relevance" of a feature, red representing „no relevance" and grey representing "not applicable".

For the colorization of the flow chart, two methods were used which resulted in different results. In a first approach, the dominant choice of the participants at each question was used to colorize the corresponding

item in the flow chart. It turned out that for most features the dominant response was „high relevance“. The result of this was a rather undifferentiated flow chart where most features were colorized in a dark green.

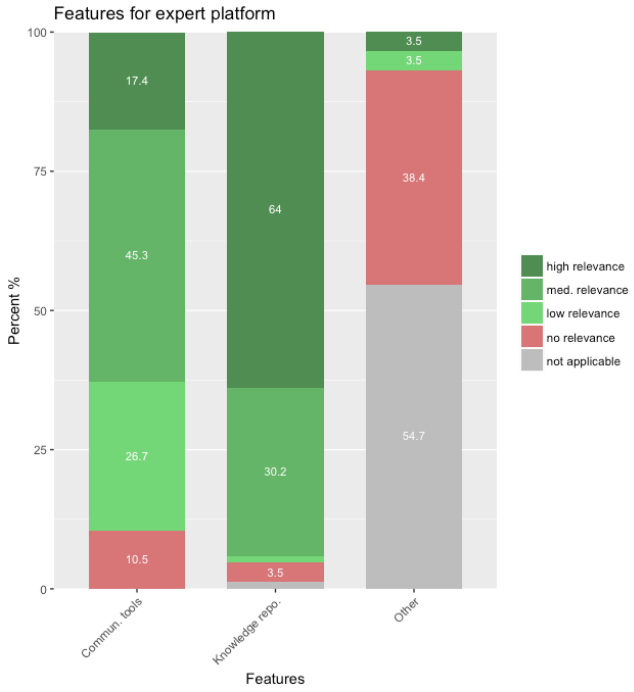

Fig. 2 - Stacked bar chart for the main features of a web based expert platform

To get a more differentiated chart, a second approach was planned and executed. In this approach, the colorization of single items in the flow chart only depended on the relative share of “high relevance“ answers.

- Share of high relevance >50% → high relevance
- Share of high relevance >25% → medium relevance
- Share of high relevance >10% → low relevance
- Share of high relevance <10% → no relevance

This approach resulted in a much more differentiated flow chart that made it possible to get a good summary of the most wanted features according to the survey (Figure 3).

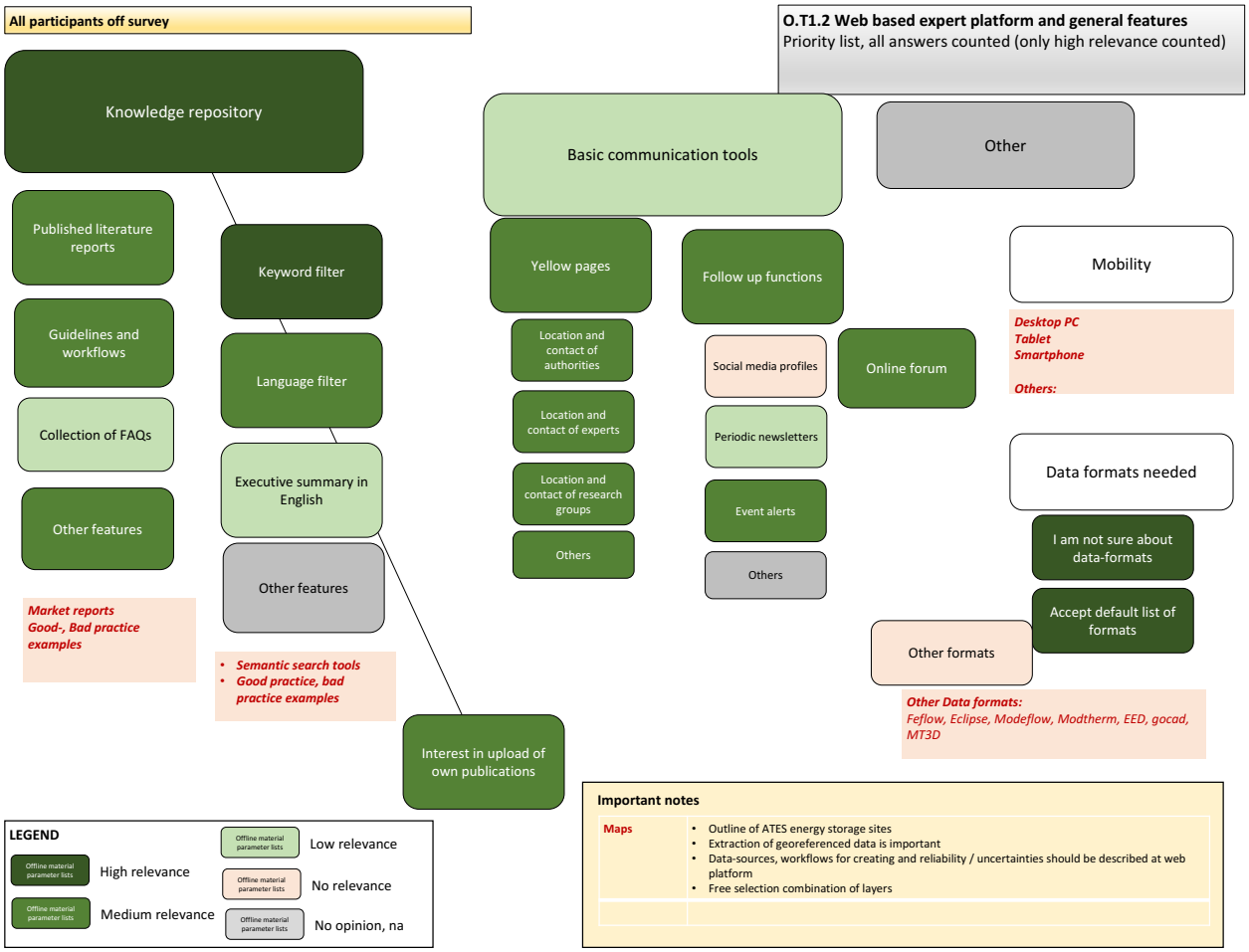

Fig. 3 - Colorized flow chart visualizing the relevance of features for a web based expert platform based on the survey

The second step in the analysis of the survey results had the goal to get differentiated results for different groups of participants. Four pairs of groups have been defined. The goal of the detailed analyses was to investigate if the relevance of the tools varies between different groups of participants in a significant way. The four pairs of groups that were compared within each other were:

- **Experts (53 user) vs. non-experts (33 user)** (<> 5 years of working experience)
- **Local to regional stakeholders (52 user) vs. supra-regional / international stakeholders (34 user):** Local to regional stakeholders cover the following professional groups asked in question #2 of the survey: Local public authorities, Regional public authorities, Planer Offices, Other SME, End User, Infrastructure and service provider Supra-regional / international samples cover: National public authorities, Interest groups / NGOs, Higher education and research
- **Regional groups: Advanced countries (DE, AT, PL) (64 user) vs. follow-up countries (SI, CZ, SK) and international answers (all countries outside of GeoPLASMA-CE) (22 user)**
- **Participants who already have used web based information systems (36 user) vs. participants of the survey without experiences (50 user).**

The steps that were taken to get the results for these target groups were the same as described above. The only difference is that only the data of each specific group was used. The result of this procedure is a flow chart for each group that is colorized depending on the relevance of a feature for this group of participants. An example for the resulting flow chart is shown in Fig. 4. All resulting flow charts are shown in the Annex.

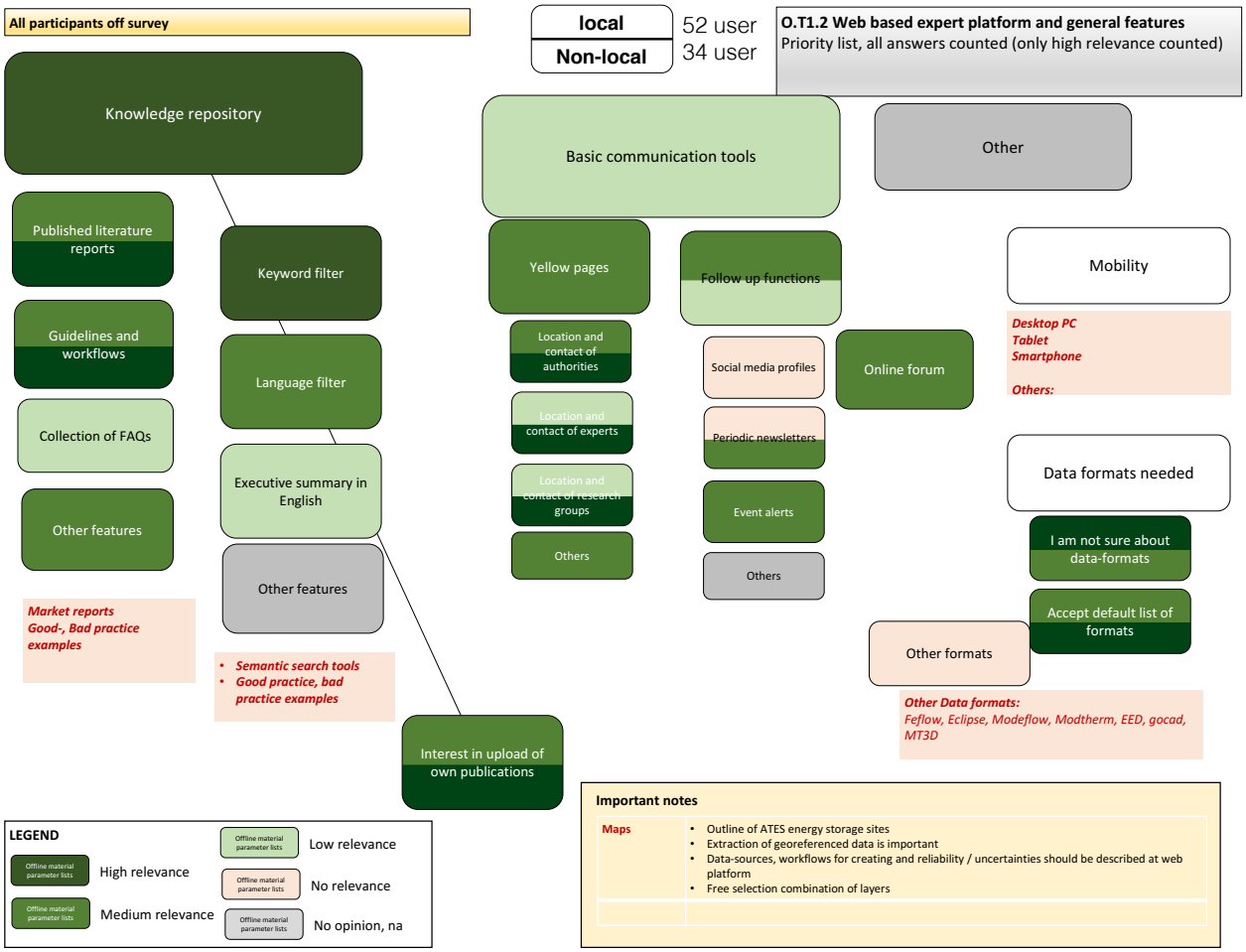

Fig. 4: Colorized flow chart for the local/non-local groups

In a last analyzing step, the ratings of "high-" and "low to no" relevance have been displayed for the different target groups at a summarizing table (see also Fig. 5). Based on the above mentioned approach of only accounting for the total share of high-relevance rankings (see also page 6 of this report), the high- and low to no relevance features were colorized in a matrix with respect to the different sample groups. For comparison purposes, the compiled answers of all participants of the survey were also shown. This matrix structure was separately applied for the high relevance and low to no relevance rankings. Finally, the total number of the above mentioned rankings were counted neglecting the compiled answers by all participant of the survey. The purpose of this exercise was to differ features, which are important for all sample groups and tools which are of importance for only a few target groups. Doing so, all functionalities rated by more than 50% of all sample groups were defined as a basic requirement of the expert platform for all pilot areas. In contrast, functionalities, which have been rated of a low- to no relevance were defined as not to be considered in the further planning of the expert platform.

Highly priority functionalities of a web based expert platform										
Functionality (**Main**/detailed)	***Total counts***	***Sample Group***								
		All participants	*Local stakeholder*	*Non-local stakeholder*	*>5 year working experience*	*<5 year working experience*	*DE, AT, PL*	*Other countries*	*Experienced in web systems*	*Non experienced*
Knowledge repository	**8**									
Published literature reports	**2**									
Guidelines and workflows	**1**									
Keyword filter	**8**									
Interest in sharing own literature	**4**									
Basic communication tools										
Yellow pages	**1**									
Location and contact of authorities	**4**									
Location and contact of experts	**1**									
Location and contact of research groups	**1**									

Fig. 5: Matrix based comparison of high relevance ranking of functionalities by the different sample groups.

Besides the analysis through visualization, statistical tests were also carried out. These tests are done to check if the difference between values is significant. For example for a question where the participants decide whether a feature has a high, medium, low or no relevance for them, these tests were used to see if the difference in responses between „high“ and „medium relevance“ for a single feature were significant. The tests that were carried out were the t-test and the chi-squared test. Neither of these tests showed a significant difference between compared values for any case they were used on.

2.4. Results of the survey

In the following chapter, we would like to give a short summary about the outcomes of the survey and the conclusions to be derived on the user requirements, presented in chapter 3. For that purpose, we will briefly discuss the aspects significance of the survey, clustering of the relevance ratings with respect to the target groups and specific comments given by participants of the survey.

Significance and scope of the survey

The survey comprised 61 questions, which have been answered by 86 participants from 10 countries. As the ratio of answers to questions of 1:1,4 is quite low, we were limiting the analysis of the survey to qualitative conclusions, which are limited to the scope of the project GeoPLASMA-CE. The survey is not valid and never intended to derive general conclusions on stakeholder needs of a web based expert platform. The outcomes of the survey led to a priority list of tools based on a user feedback, which will be considered in the planning of the web based expert platform to a certain extend (for more information see chapter 3).

Clustering of answers given by the different sample groups

Concerning highly relevant features of a web based expert platform only the main tool “Knowledge repository” and the associated detailed feature “keyword filter” has been uniformly rated as relevant by all sample groups. In a first step, we were comparing the interests of non-local (regional to international)

stakeholders to the interests of local stakeholders, representative for users at the 6 pilot areas. It turned out, that local stakeholders have a significantly lower interest in the expert platform in general. Only a knowledge repository and a keyword filter search tool were rated as highly relevant. Interestingly, neither contact details to authorities nor contact details to local experts (e.g. installers) have been seen as relevant by this group. This is in line with the answers gave for the web based decision support and information tool. Nevertheless, local stakeholders would be interested in online communication with authorities and in the online exchange of documents for licensing of shallow geothermal use.

In contrast, non-local stakeholders are interested in more features of the proposed web based expert platform. We also observed a generally higher interest of stakeholders not located in Germany, Poland and Austria. Non-local stakeholders having professional experiences less than 5 years are also interested in the exchange of literature and guidelines. In turn, this cluster is also interested in providing literature to the expert platform. Once again, the interest in getting access to literature and guidelines is higher at participants from other countries than Germany, Poland and Austria. We may conclude, that the existing platforms in the above mentioned countries are well established and as a result of this, stakeholders do not have a strong interest in further literature exchange platforms. Concerning basic communication tools, especially a yellow pages feature, non-local stakeholders from other countries than Germany, Poland and Austria would be interested in contact details of authorities, especially in case they have more than 5 year experience in the field of shallow geothermal use. In addition, these cluster is also interested in contacts to experts and research teams. In that context, we don't see differences in interest between participants of the survey form Germany, Poland or Austria and participants from other countries.

Finally, we also like to summarize the low to no interest in features of a web based expert platform, given by the participants of the survey:

Concerning the proposed "Knowledge repository" low interest have been expresses for collection of FAQs resulting from an online forum hosted at the expert platform. The majority of the defined sample groups are also not interested in getting access in literature in other national languages via an executive summary in English language. A uniformly low interest was expressed for social media profiles. A similar very low ranking was given for periodic newsletters except for non-local stakeholders from other countries than Germany, Poland or Austria. Local stakeholders represent again the cluster expressing giving the highest number of low to no interest for detailed features. All features listed in this category were rated as low to not relevant except for a language filter provided for the Knowledge repository and follow-up functions associated to basic communication tools. Non-local stakeholders are in turn not interested in follow-up functions except experienced experts from Germany, Poland or Austria.

Text input by participants of the survey

We also offered free text input dialog boxes for the knowledge repository in concerns of content and features of the repository at the survey. The feedback received from the participants can be summarized to the following main messages, which should be considered in planning the expert platform:

- Market reports and good practice examples for shallow geothermal use should be available in a knowledge repository
- Link to existing strategies on climate and energy
- Examples for conflict of use
- For an easily searchable knowledge repository, semantic search tools would be helpful

Summary

The answers received at the survey led to the conclusion that there are some basic features, which are uniformly of high (Knowledge repository) or no importance (Basic communication tools) for all participants.

In addition, we can see slightly different rankings between local- and non-local stakeholders. For the main feature knowledge repository a regionalization of the expert platform will not make many sense as this is more planned to be a platform for general knowledge about the topic. For the basic communication tools, a regionalization might make sense as the contact details of experts or the authorities in general only matter on a local scale in the pilot areas. A person from e.g. the pilot area Vienna is not interested in the contact details of the authorities for the pilot area of Ljubljana for example.

Concerning the platform of a web based expert platform, the main platform is the Desktop-PC. A second priority should be given to tablet users. Smartphones are not a relevant platform based on the outcome of the survey.

3. Catalogue of requirements

3.1. Introduction

Similar to the web based decision support and information tool, a priority list has been established for the main tools and the associated detailed features of the web based expert platform. The classification considers the following aspects:

- 3 Priority classes (1 to 3) for the realization of the web tools (1 = highest priority)
- Differentiation between tools for local expert platforms (part of O.T1.1 Web based decision support and information tools) and tools for the international expert platform (O.T1.2).

The final features of the six local web platforms for the pilot areas will be made after a consultation of the responsible project partners.

3.2. General requirements of the web based expert platform

- Regionalization of the web based expert platform for the 6 pilot areas

  A regionalization of parts of the expert platform should be considered for the 6 pilot areas. This concerns mostly the basic communication tools which make most sense on a local scale. For the knowledge repository, which intends to give general information on the topic, such a regionalization can also be considered for e.g. guidelines that only apply on a certain pilot area. The pilot areas have to make the decision if they have content and contact details that should only be available in their pilot area.

3.3. High priority features

- **Knowledge repository – International platform (O.T1.2):**
  The expert platform intends to transfer knowledge on shallow geothermal use between experts from different European regions. Though the expert platform requires a knowledge repository where information on the topic is published and available to the experts.
    - Literature and published reports on topics of shallow geothermal use
    - Selection of guidelines and workflows for planning, assessment, management and monitoring of shallow geothermal use
    - Keyword filter for literature research
    - Upload function for own literature to share it on the expert platform

- Links to market reports and policy strategies
- Semantic search tools for the literature on the expert platform

- **Knowledge repository – Local platforms (Part of O.T1.1):**
  - Keyword filter for literature research
  - Semantic search tools for the literature on the expert platform
- **Basic communication tools – International platform (O.T1.2):**
  The expert platform is supposed to provide basic communication tools like yellow pages as well as some follow-up functions like social media profiles
  - Yellow pages cover authorities, experts and research institutes operating at the field of shallow geothermal use. The contact details of entities, which do not represent public authorities will only be displayed on a voluntary basis.
    - Location and contact details of relevant authorities
    - Location and contact details of research institutes (voluntary registering)
    - Location and contact details of experts (planners, installers) (voluntary registering)
- **Basic communication tools – Local platforms (Part of O.T1.1):**
  - Online communication to authorities (answer given for web based decision support and information tool)

3.4. Medium priority features

- **Knowledge repository – International platform (O.T1.2):**
  - Language filter for published literature and reports
- **Knowledge repository – Local platforms (Part of O.T1.1):**
  - Published literature
  - Guidelines and workflows
  - Upload function for own literature
  - Language filter
- **Basic communication tools – International platform (O.T1.2):**
  - Follow-up functions
    - Periodic newsletters
    - Event alerts
    - Online forum
- **Basic communication tools – Local platforms (Part of O.T1.1):**
  - Follow-up functions
    - Event alerts
    - Online forum

3.5. Low priority features

- **Knowledge repository – International platform (O.T1.2):**
  - Collection of FAQs (taken from an online forum hosted at the expert platform)
  - Executive summary of national literature in English language
- **Knowledge repository – Local platforms (Part of O.T1.1):**
  - Collection of FAQs (taken from an online forum hosted at the expert platform, CZ, SK, SI)
  - Executive summary of national literature in English language (DE, PL, AT)
- **Basic communication tools – International platform (O.T1.2):**
  - Follow-up functions
    - Social media profiles (e.g. Facebook, Twitter, Researchgate)
- **Basic communication tools – Local platforms (Part of O.T1.1):**
  - Follow-up functions
    - Social media profiles
    - Periodic Newsletters (CZ, SK, SI)
    - Location and contact details of authorities, experts and research institutes

4. Outlook on upcoming activities

The next milestone in preparing the web based expert platform is given by the accomplishment of a so called White Book (D.T1.4.1). The White Book summarizes the tools and detailed features, which will be realized for the expert platform (O.T1.2.). It will also include a general concept of the associated web site interfaces and a time plan for the launch of individual tools. It will not yet include detailed pseudo web programming codes for the realization of the planned tools. The following information will feed into the preparation of the White Book:

- Feedback from the WPT1 survey (D.T1.2.2 Catalogue of requirements) leading to a priority list from the stakeholder‘s point of view.
- Optional: Final feedback from local stakeholders in the pilot areas for final amendments.

5. References

R Development Core Team (2008); R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL http://www.R-project.org.

6. Annex: Catalogue of requirements

- Annex 1 – Stacked bar charts displaying the results from the user survey
- Annex 2 – Flow charts displaying the relevance of features for the participants of the survey

CATALOGUE OF REQUIREMENTS FOR THE WEB BASED EXPERT PLATFORM

Annex 1 – Bar charts expert platform

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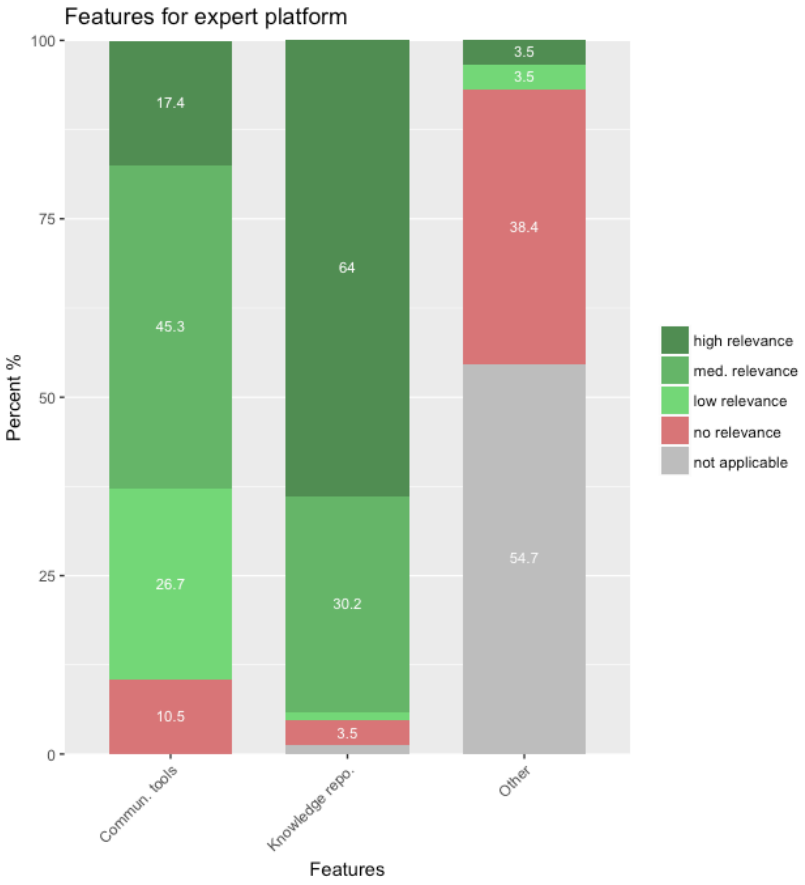
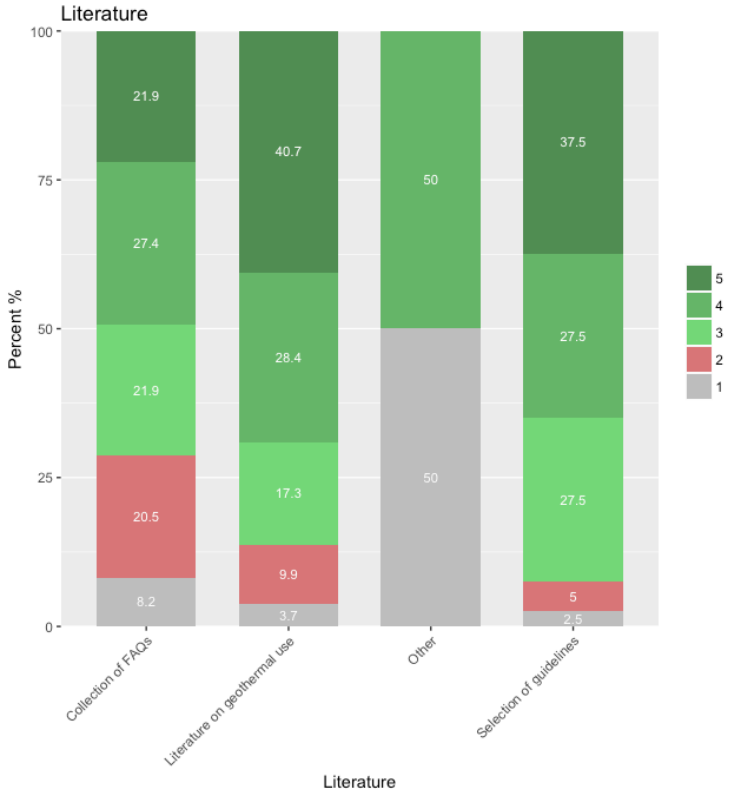
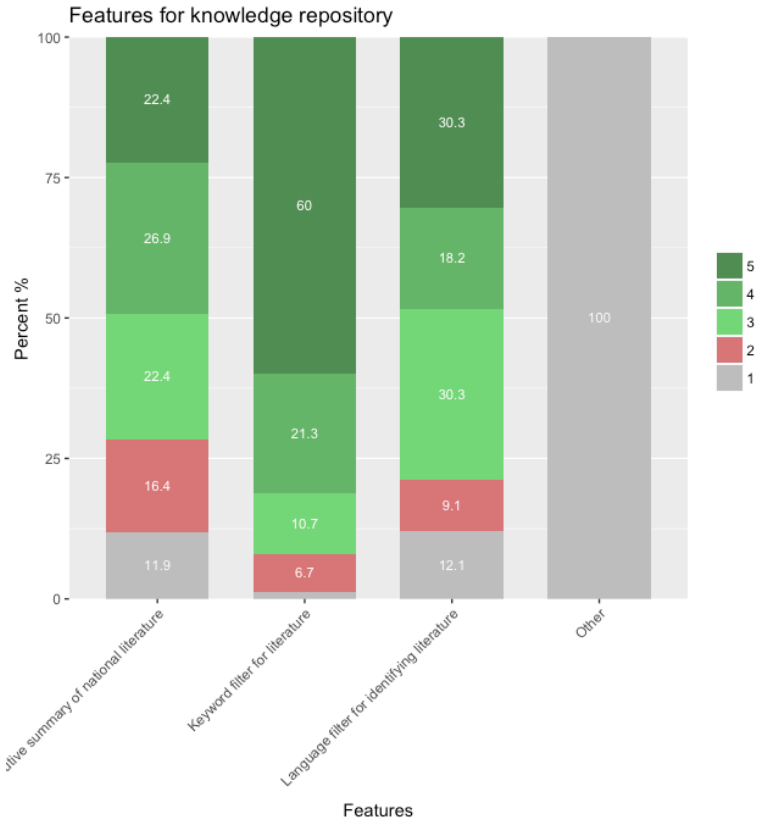


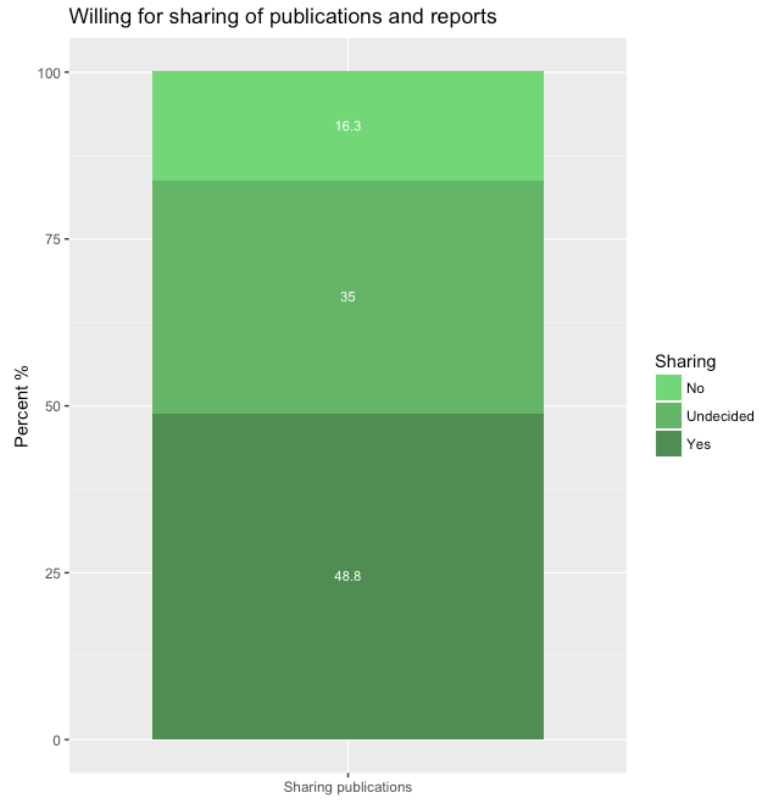
A.1.1 Stacked bar chart for features of an expert platform



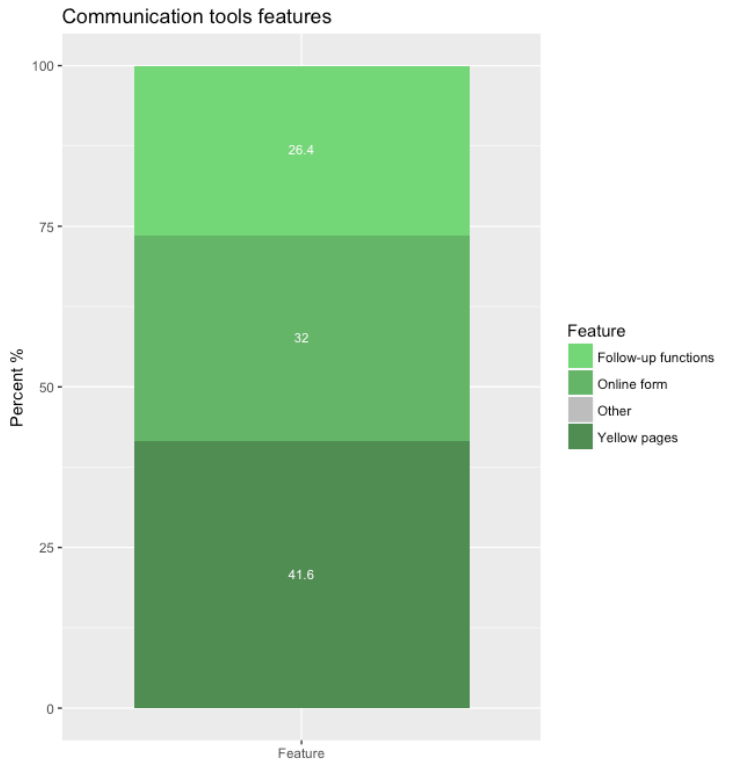
A.1.2 Stacked bar chart for literature in the knowledge repositor



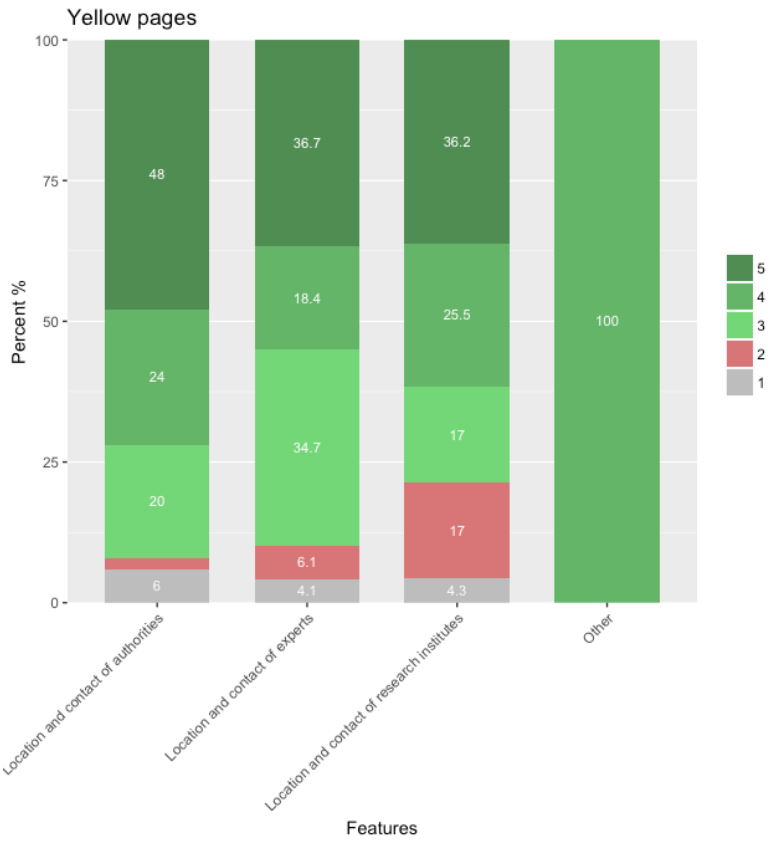
A.1.3. Stacked bar chart for features of knowledge repository



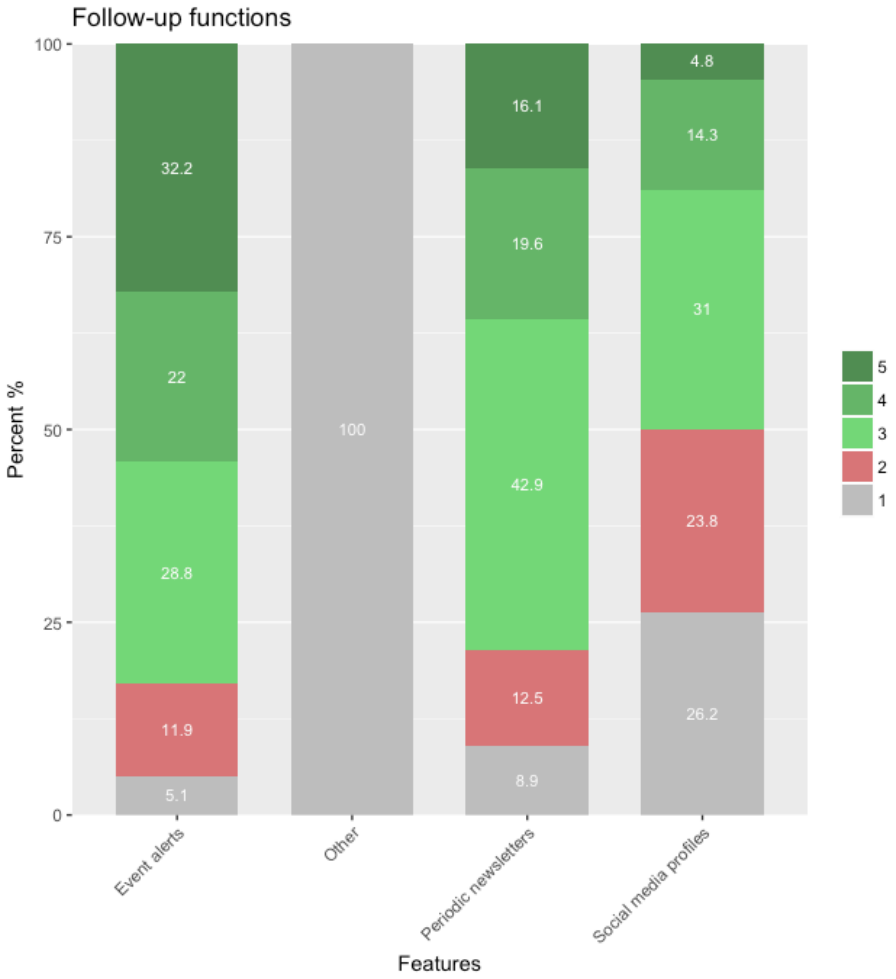
A.1.4. Stacked bar chart for willingness to share publications or reports



A.1.5. Stacked bar chart for features of communication tools



A.1.6. Stacked bar chart for features of yellow pages



A.1.7. Stacked bar chart for features of follow-up functions

CATALOGUE OF REQUIREMENTS FOR THE WEB BASED EXPERT PLATFORM

Annex 2 – Flow charts for expert platform

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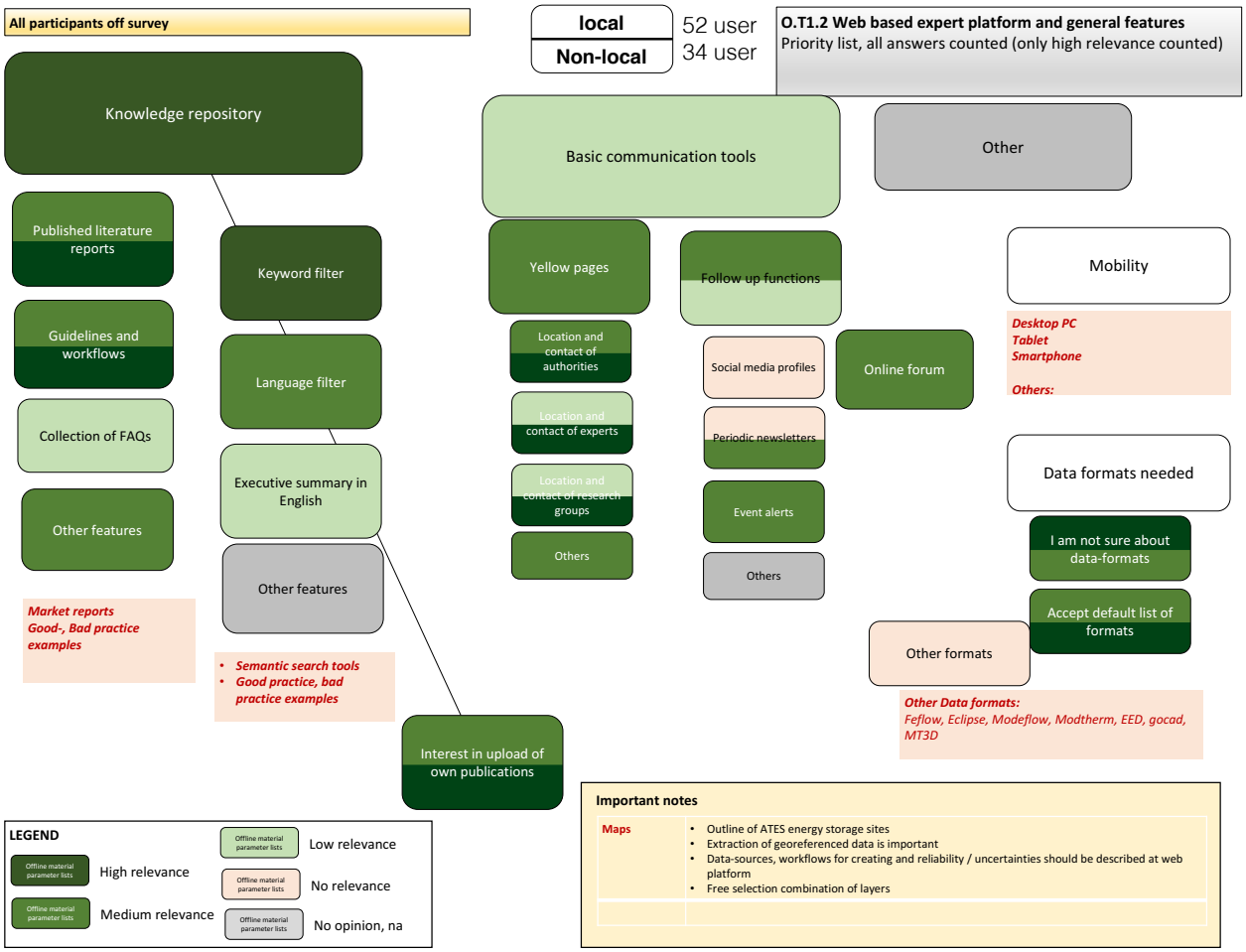
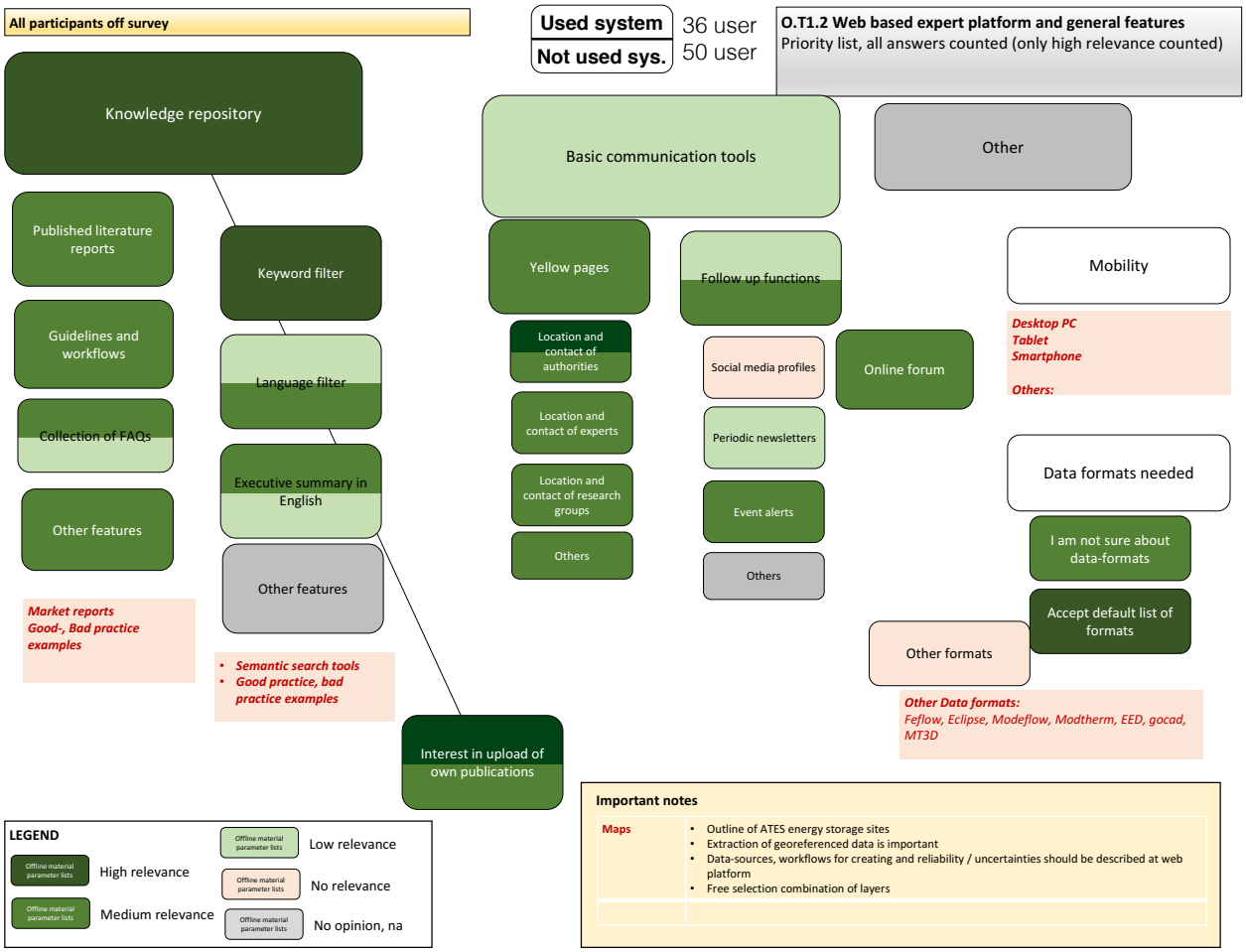
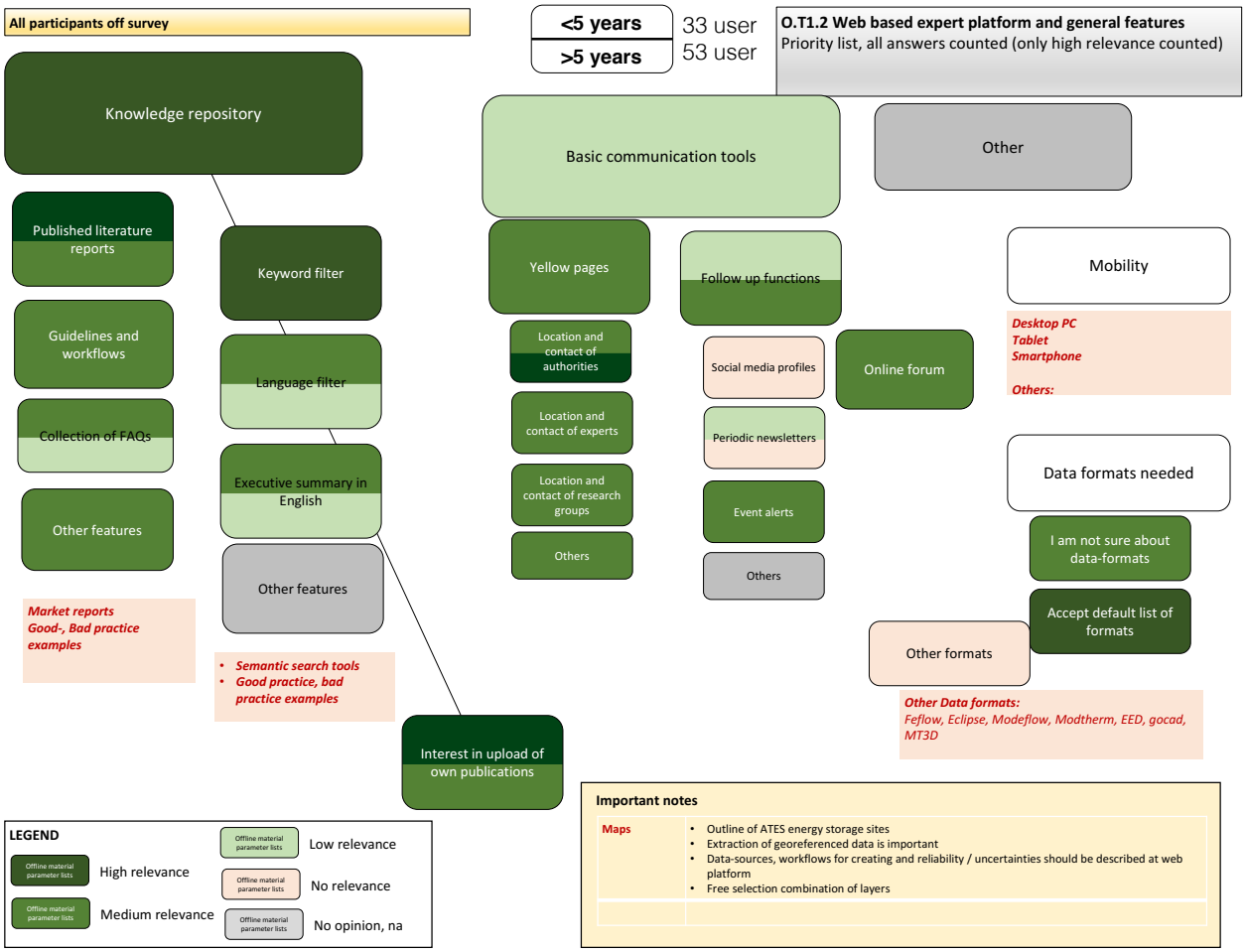


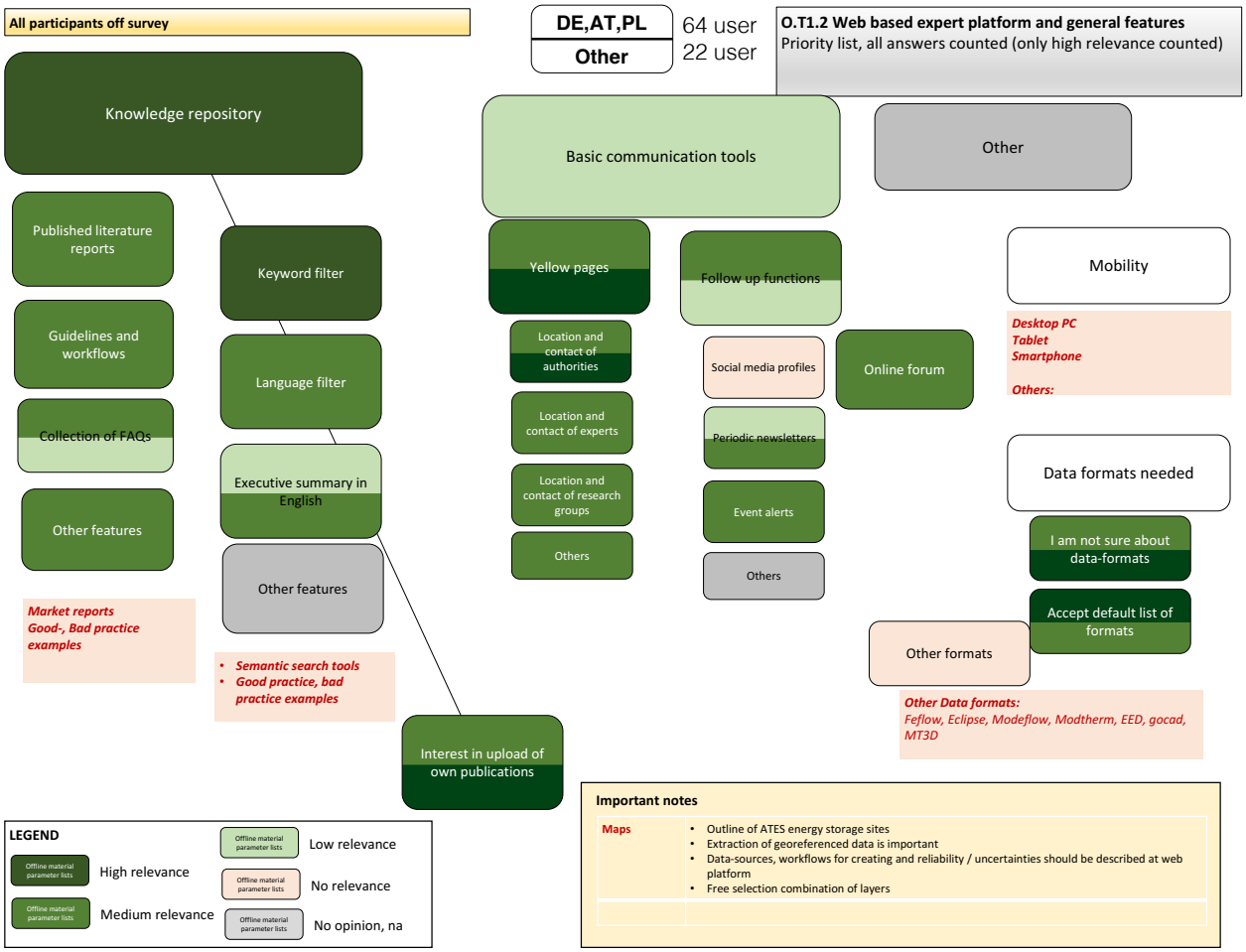
A.2.1. Flow chart of features colorized depending on the relevance for the target groups “local” vs. “non-local”



A.2.2. Flow chart of features colorized depending on the relevance for the target groups “used a web based info system” vs. “never used a web based info system”



A.2.3. Flow chart of features colorized depending on the relevance for the target groups “more than 5 years of experience in the field” vs. “less than 5 years of experience in the field”



A.2.4. Flow chart of features colorized depending on the relevance for the target groups “DE, AT, PL” vs. “Rest”