



timbre

Tailored Improvement of
Brownfield Regeneration
in Europe

TIMBRE Information System for Brownfield Regeneration

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TIMBRE Information System for Brownfield Regeneration

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Introduction

The TIMBRE project aims at overcoming existing barriers to brownfield regeneration by developing and providing customised problem- and target-oriented packages of approaches, technologies and tools tailored to end-user needs.

Within the TIMBRE project, the main objective of Work Package 1 (WP1) is the development of a web-based engine, the so called **TIMBRE Information System for Brownfield Regeneration** (henceforth “Information System”) for the collection, analysis and classification of the available literature, databases and other information about approaches, tools, case-studies and best-practices related to brownfield regeneration, as developed in previous international and national projects, initiatives and field applications. The Information System will be included in the TIMBRE Tool Suite to be developed in WP7.

The potential users of this tool are considered to be quite diverse, including all people involved in at least one step of the brownfield regeneration process. Moreover, the tool has been built to respond to the information needs of experts (e.g. consultants, central and local authorities, scientific community etc.) dealing with brownfield regeneration.

One of the main components of the Information System is the **web database**, where web links to the material and information of interest on brownfield regeneration are collected, stored and made easily searchable by users. The structure of the web database is constituted by the framework for the collection of information about brownfield regeneration which has been developed through a participatory approach involving different stakeholders groups from different European countries. This framework and its development are fully described in the TIMBRE project’s Milestone MS11 “Decisional framework developed during the workshops organised for the involvement of experts and stakeholders” (Pizzol et al., 2012b), while the main characteristics and functionalities of the web database are explained in the Deliverable D1.1 “Web database with a structured site related inventory of European brownfield information and data” (Pizzol et al., 2012a).

In order to provide the most relevant and updated information and tools for each phase of the brownfield regeneration process according to users’ specific characteristics, requirements and needs, a **multi-criteria methodology for the evaluation and ranking of the collected information** has been developed and implemented within the Information System. A detailed description of the ranking methodology is available in Deliverable D1.2 “TIMBRE Expert System Prioritisation Methodology & Preliminary Identification of Methodological and Technological Gaps” (Giubilato et al., 2013).

The main objective of the present Deliverable D1.3 is to present the main characteristics of the Information System including structure, functionalities and ranking methodology in order to support the understanding and the evaluation of the developed tool that is now available.

Deliverable D1.3 – “TIMBRE web based expert system: -Web-based search engine to support experts and end-users to get access to all the available information concerning brownfields” consists of the frozen as of today version of the Information System, which can be found at the internet link: <http://www.dais.unive.it/~timbre/InformationSystem/src/>, and of this report. The public version of the Information System is available via the TIMBRE website at: <http://www.timbre-project.eu/informationssystem.html>.

In this document, the technical features, the structure, the functionalities and the ranking methodology of the Information System are first presented (Chapter 2), and then a focus on a series of testing activities that have been performed on the tool are described in Chapter 3.

Moreover, the Information System User Manual is provided in Annex I of this document, reporting instructions for accessing, consulting and uploading new information in the tool.

TIMBRE Information System for Brownfield Regeneration technical features and structure: web database, ranking methodology, interfaces and functionalities.

1.1 TIMBRE Information System technical features

The Information System for brownfield regeneration will be a core component of the TIMBRE tool suite. The public version will be promoted via a TIMBRE tool suite landing page to be developed jointly with work packages (WPs) 1 “Expert System”, 3 “Prioritisation” and 6 “Site assessment” in WP7 “Dissemination & Tool Suite”.

For the purpose of this deliverable, a static version with the state-of-development, as of the day of delivery, has been created. Via the following link, the files to create this version of the Information System are provided including instructions on how to install the tool in a personal computer: <http://www.dais.unive.it/~timbre/InformationSystem/src/>

To ensure openness and as wide as possible applicability, the Information System is based on LAMP architecture: this acronym refers to a common combination of software used in many web servers, i.e. Linux, Apache, MySQL, and PHP. This is a wide spread, open source web server architecture, which proved to be stable and reliable during the years. The Information System website is indeed hosted in a Linux machine running an Apache web server. Apache HTTP Server, commonly referred to as Apache (<http://httpd.apache.org/>), is the most used web server software, available for a variety of operating system including Unix/Linux and Microsoft Windows. Released under the Apache License, Apache is open source software.

The website makes use of MySql database server (<http://www.mysql.com/>) for data storage.

On the basis of the contents of the MySql database, the generation of the web interface is implemented through Php (<http://www.php.net/>), which is a freely available general-purpose scripting language designed for web development in order to produce dynamic web pages. In other words, Php scripts act as an intermediate layer between the MySql database and the presentation of the contents to the user through web pages.

Finally, client-side actions (e.g. forms validation and change of contents without page reload) are provided by means of Javascript functions (<http://www.java.com/it/>) powered by the JQuery package (<http://jquery.com/>), a Javascript library designed to simplify the client-side scripting of HTML.

During the development of the Information System, anonymous users were not allowed to visualize the web contents. User login was required to WP1 partners who were asked to upload their materials on the website. Authentication is managed through a list of allowed users which is archived in the MySql database. The list was maintained by the web master, i.e. anonymous users could not claim a new login.

Now that the Information System is available to the public, people interested in using the tool can freely access it following a log-in procedure.

1.2 TIMBRE Information System structure

As reported in Figure 2.1, the Information System is composed of the TIMBRE web database, where the web links to relevant information on brownfield regeneration are stored and by the ranking methodology that allows to classify those web links according to users' characteristics and information needs: these two components are integrated into the tool and users can benefit from their features through user friendly functionalities and interfaces (Fig. 2.1).

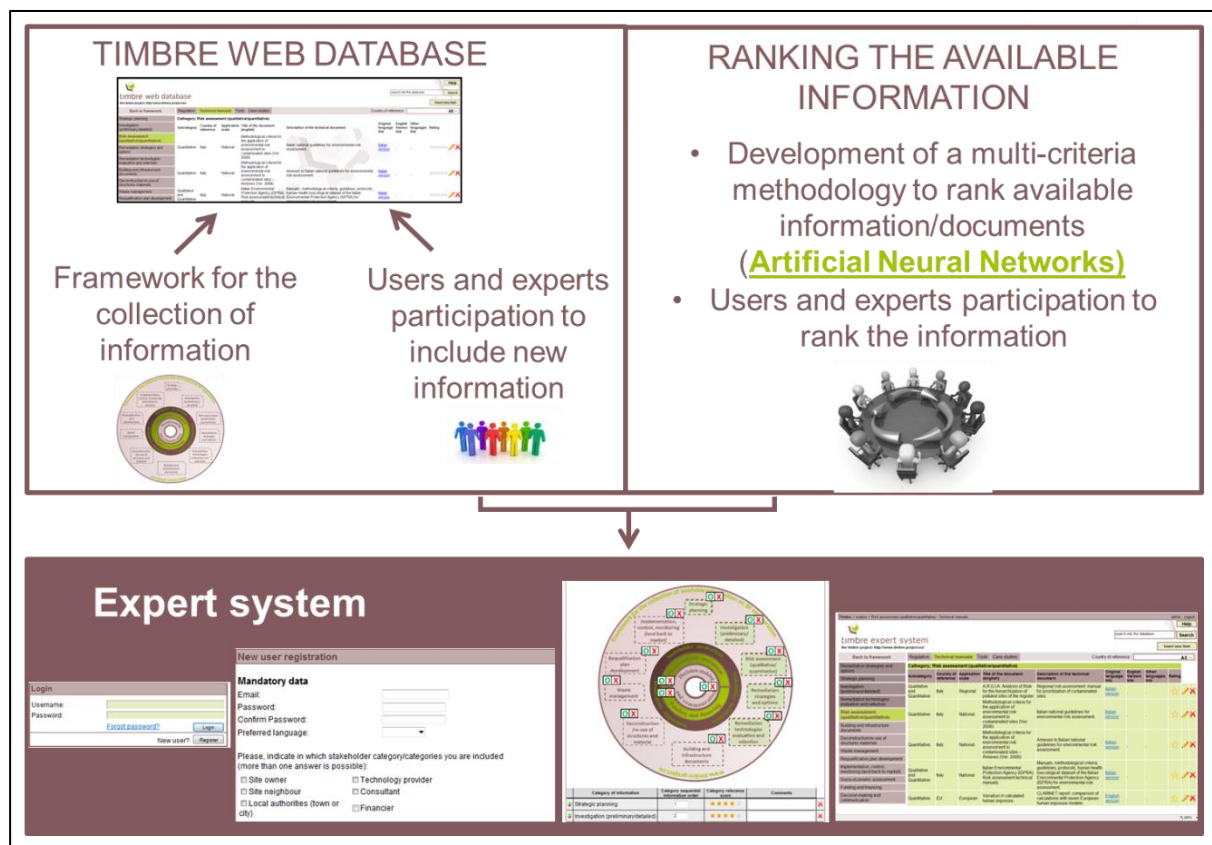


Figure 2.1. Information System components and structure.

1.2.1 TIMBRE web database

The TIMBRE web database, as explained above, is one of the main components of the Information System, and is aimed at containing a wide collection of web-links information on brownfield regeneration. The structure of the TIMBRE web database has been developed on the basis of the framework for the collection of information on brownfield regeneration (Figure 2.2), which is the result of a participatory process that aimed at involving TIMBRE partners, TIMBRE case studies stakeholders and external stakeholders.

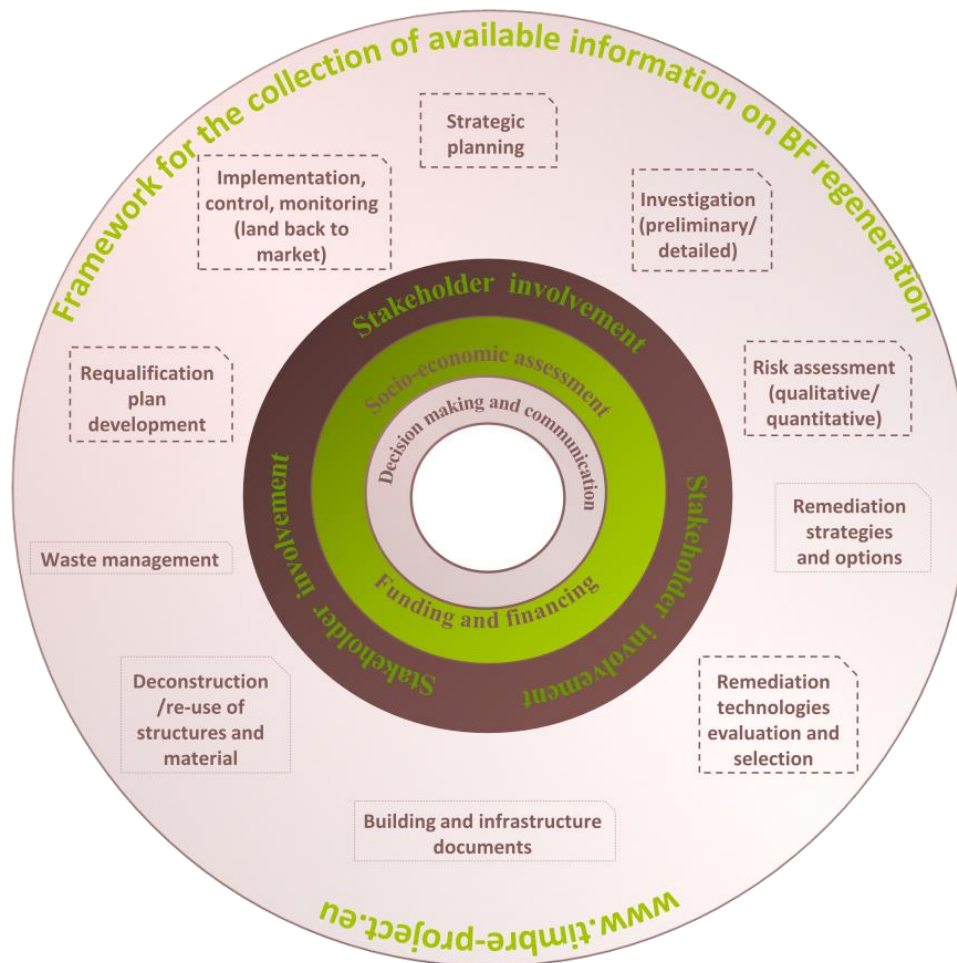


Figure 2.2. Framework for the collection of available information on brownfield regeneration.

The web-links are classified, within the Information System, according to the information categories of the framework and also based on the typology of documentation they represent (i.e., regulations, technical manuals, tools and case studies).

1.2.2 TIMBRE Information System ranking methodology

Different stakeholders may have different specific needs when they look for specific information about the various phases of the brownfield redevelopment process—not least depending on their work tasks, their experience, the regulatory context they are operating in, and so on. The distinctive objective of the TIMBRE Information System is to provide each end-user with the most suitable instruments, approaches and information for each of the main phases of the brownfield regeneration process, meeting his/her specific characteristics, requirements and needs as well tailored as possible.

According to this objective, the Information System is meant to be a user-friendly search tool automatically proposing to the user a tailored list of web links. The latter are ordered by relevance on the basis of specific criteria set by the user when performing his/her search.

The analysis and ranking methodology to be implemented in the Information System should exploit a set of “criteria” related to the end-user (e.g. category of end-user, language) and to the specific features of his/her search (e.g. country of interest, specific search aim) to provide the end-user with those web links that best satisfy his/her expectations and needs.

Moreover, the Information System is thought to be an interactive system, where the end user will be able to evaluate the outputs provided as result of his/her search session(s). This evaluation is then used to refine and better tailor the outputs of future searches performed by other users.

To integrate the above-mentioned types of information (i.e. inputs related to the criteria) with the aim of ranking the web links according to specific end-user requirements, a flexible multi-criteria methodology was developed, which had to satisfy the following features:

- a) the methodology should be able to “learn” from the different search sessions and, for each new search, to refine the proposed list of ordered web links according to the links’ evaluations received by previous users in the past with similar characteristics as those of the current user;
- b) the methodology should have the capability to deal with a possible lack of data in the input information for the ranked search, considering that the end-users will be left free to choose which kind of criteria to specify when starting a search (i.e., not all information asked of the end-users are mandatory, thus the methodology should be applicable even when some input data are missing).

Following these premises, the developed methodology:

- i) can work in a context where there is no a priori knowledge about the way to rank web links (i.e., about the preference model of the users, dealing with different types of possible users);
- ii) should be able to learn from experience; and
- iii) should be able to perform effectively also in the presence of data gaps.

The developed ranking methodology makes use of Artificial Neural Networks (ANN) (Mehrotra et al., 1997) which are mathematical nonlinear regression models, which, after a so-called “learning phase”, are able to infer the model underlying a set of given inputs and outputs used as a “training set”.

An ANN is inspired by biological neural networks and consists of an interconnected group of artificial neurons, which processes information using a connectionist approach to computation (Deliverable D1.2 “TIMBRE Expert System Prioritisation Methodology & Preliminary Identification of Methodological and Technological Gaps”, Giubilato et al., 2013)

The proposed methodology for ranking the web links to be implemented in the Information System is based on the idea of developing a system with the ability to continuously learn from past search sessions in order to improve the provided results.

The methodology uses a set of information, collected during each search session, namely:

1. “User related” inputs are data provided by the users during registration to the Information System. They refer to specific user’ characteristics stored on his/her profile page (which can be updated/modified as needed). More specifically these inputs are:
 - “Preferred language”: the user is asked to indicate the preferred language when searching for information. According to this selection the system provides a list of web links where documents are written in the user’s preferred language. The subsequent links refer to material written in English, and afterwards in other languages.
 - “Stakeholder category/ies the user belongs to”: this information is used by the system in order to provide the user with the most visualized web links by previous users belonging to the same typology of stakeholders.
2. “Session related” inputs are provided by the user during each search session, thus they can change for the same user from session to session and depend on the specific tasks he/she is using the Information System for. These inputs are the following:
 - “Aim of search”: for each session the user is asked to indicate his/her search aim when using the Information System. This information is used to provide tailored information to the user. A list of search aims will be provided and the users can choose one option from the list or indicate a new particular search aim.
 - “Country of reference”: for each session, the user is asked to indicate the country where the needed information is intended to be applied. This information will affect the results (ranking of web links), which will be provided in the following order: first the links related to the selected country (including links to documents/materials written in the selected country’s language), then web links referring to the language indicated by the user as the preferred one, then links to material written in English, and finally in other languages.
 - “Selected information categories”: in each session, the user is asked to select the information categories of the framework that are related to his/her main search aim.
 - “Scores of information categories”: after selecting the information categories, the user is asked to evaluate them, assigning a score from 1 to 5 (where 1 is associated to the lowest evaluation and 5 to the highest evaluation) according to his/her personal preferences and expertise.
 - “Typology of information”: after the selection of the information categories the user can select also the typology of information of interest, choosing among “Regulation”, “Technical manuals”, “Tools” and “Case studies”.

3. “Scores” inputs refer to the evaluation of the web links contents (i.e., associated documents) provided by each user at the end of a search session according to the following criteria:

- “Pertinence”: the user is asked to specify if a specific web link’s information is pertinent and related with his/her previously defined aim of search (yes/no answer);
- “Appropriateness”: the user is asked to indicate if a specific web link’s information is appropriate for the previously indicated information category/ies (yes/no answer);
- “Usefulness”: the user is asked to evaluate the level of usefulness of the web link information in achieving the specific aim of search (score: from 1 to 5, where 1 is associated to the lowest evaluation and 5 to the highest evaluation);
- “Clarity”: the user is asked to evaluate the level of clarity of the web link information, considering the description of concepts and the use of specific vocabulary (score: from 1 to 5, where 1 is associated to the lowest evaluation and 5 to the highest evaluation);
- “Reliability and accuracy”: the user is asked to evaluate the level of reliability and, consequently, accuracy of the information that can be evaluated considering the quality and the trustworthiness of the source of information (score: from 1 to 5, where 1 is associated to the lowest evaluation and 5 to the highest evaluation);
- “Updating”: the user is asked to evaluate the level of topicality of the information and the compliance with the latest regulatory frameworks (score: from 1 to 5, where 1 is associated to the lowest evaluation and 5 to the highest evaluation).

These evaluation scores are stored by the system and used to refine the ranking in search sessions performed by subsequent users.

Finally, the last inputs are referred to “Statistics”:

- Number of clicks received by a web link from users belonging to the same stakeholder category: it indicates the level of interest from the same stakeholder category for that web link.
- Total number of clicks: it indicates the level of interest for a particular web link.

1.2.3 TIMBRE Information System interfaces and functionalities

The Information System integrates the web database and the ranking methodology and provides suitable results on user friendly interfaces that have been developed according to stakeholders' suggestions gained during dissemination activities (i.e. Berlin workshop on the 27th of November 2013, and Brno workshop on the 29th of November 2013).

The Information System includes the following functionalities:

- registration and log in;
- search for information in the tool;
- definition of the search aim and selection of the country of interest;
- selection of the information categories related to the pre-defined search aim;
- visualisation of results;
- evaluation of information;
- add/upload new information to the tool;
- modify or delete information;
- password recovery and modification;
- procedure to become an Expert user;
- help;
- log out.

Testing activities for the improvement of the Information System, outcomes and lessons learned

1.3 Introduction

During the development of the Information System, the active involvement of **project partners** and **stakeholders**, both expert in brownfield redevelopment, has always been considered of crucial importance in order to guarantee a shared result as outcome of project activities.

Project partners have been involved along all the steps that brought to the development of the tool: they participated in the development of the framework for the collection of available information on BF regeneration, in the development of the web database, in the refinement of the ANN methodology and in the test of the preliminary version of the Information System.

More specifically, project partners have been involved in a TIMBRE internal testing activity as soon as the preliminary version of the Information System was completed (see MS12). They have been invited to test the tool simulating a real use in order to provide feedbacks on the usability of the Information System as well as to upload new information within the Information System.

The simulation of a real use of the system performed by the timbre partners was the first learning phase, as well as all the other stakeholders events represent other learning phases. In fact, through the ANN, the system improves the results of elaborations at each user session, providing the users with increasingly tailored outcomes.

According to the suggestions gained from TIMBRE partners, the tool functionalities have been improved and, subsequently, the Information System has been presented to external stakeholders in a more refined version.

Two workshops, one in Germany (Berlin, 27th of November 2013) and one in the Czech Republic (Brno, 29th of November 2013), have been organised in order to involve local stakeholders. On those occasions, the Information System was presented and participants were invited to use it. The main aims of these events were to collect general feedbacks on the tool, and examples of the most common “search aims”. Thanks to participants’ inputs, the Information System “knowledge base” increased and useful information about the need for further improvements concerning the tool functionalities has been collected.

These two workshops involved many categories of stakeholders such as site owners, site neighbours, local authorities (town or city), region and sub-regional governments, regional and national regulators, local community groups (neighbourhood, districts), public interest groups, developer/investors, technology providers, consultants, contractors, end-users and researchers.

In the following section, more detailed information on the testing activities conducted by project partners and by the Berlin and Brno workshops’ participants on the Information System is provided. Finally, in section 3.3, the outcomes of the testing activities and the lesson learned are also presented.

1.4 Testing activities on the Information System

The testing activity on the Information System consisted of three phases, which can also be seen as three learning phases. The first testing activity has been conducted internally by TIMBRE WP1 partners (the 18th of October 2013), while the second and the third testing activities have been carried out by German and Czech stakeholders organized for the 27th of November 2013 and the 29th of November 2013, respectively. In the following sections, more details are provided.

1.4.1 Testing activity performed by TIMBRE partners

TIMBRE partners have been invited to perform the testing activity on the Information System in order to provide feedbacks, suggestions and inputs to improve the tool. During the testing of the system, the evaluation of the information contents according to the identified evaluation criteria (i.e. Pertinence to user's search aim, Appropriateness for category of information, Usefulness, Clarity, Reliability and accuracy and Updating described in Paragraph 2.2.2) was performed by TIMBRE partners in order to enhance the "knowledge base" of the Information System. Accordingly, the testing activity performed by TIMBRE partners represents the first "learning phase" for the tool.

The testing activity was performed prior to the workshops of Berlin and Brno to allow workshops' participants to have the opportunity to work on a version of the Information System already tested by project partners, improved according to their feedbacks and requests, and "fed" with their expert inputs.

1.4.2 Testing activity performed by stakeholders during Berlin and Brno workshops

The first event, the Berlin workshop, was held on the 27th of November 2013 and addressed experts and representatives of brownfield owners, regulators and further stakeholders interested or involved in the re-development of brownfields and former industrial sites.

To increase the stakeholder participation, the workshop was in German language with English translation just for TIMBRE partners.

The second event, the Brno workshop, was held on the 29th of November 2013, addressed many categories of stakeholders (e.g., site owners and neighbours, local authorities, consultants, scientific community and researchers) and was in Czech with English translation for TIMBRE partners.

Participants in both of the events had the opportunity to directly access the online tool individually, with their own credentials, and to gather a live experience related to the use of the information stored into the tool.

The main aims of the workshops were to collect feedbacks, suggestions and inputs to improve the tool, to identify different uses of the system according to end users' needs (e.g., identification of the most common "search aims") and to evaluate the consulted information/documents according to the identified evaluation criteria (described in paragraph 2.2.2).

At the end of the workshops two questionnaires have been submitted to participants in order to collect feedbacks on the Information System itself and on the workshop's contents, material, instructors and organisation.

Comments on the workshop feedbacks and questionnaires' results are provided in the following section 3.3.

1.5 Testing activities outcomes and lesson learned

1.5.1 Feedbacks on the usability of the Information System

The feedback received by the TIMBRE partners that performed the testing activity of the Information System brought to the identification of some points of improvement and open issues.

Some of these points of improvement and open issues have then been confirmed by some comments received from the workshops' participants involved into the discussions that took place during the events. Moreover, specific feedbacks related to the level of tailoring of the Information System have been collected through a questionnaire submitted to the workshops participants.

The points of improvement collected from TIMBRE partners and stakeholders can be divided in two groups, one concerning the information stored into the tool (i.e. quantity and quality of available information), and the other related to the functionalities of the tool.

One of the main advantages of the developed Information System is to collect and provide useful information on brownfield regeneration, classified according to specific information categories (i.e. "Strategic Planning", "Investigation (preliminary/detailed)", "Risk assessment (qualitative/quantitative)", "Remediation strategies and options", "Remediation technologies evaluation and selection", "Waste management", "Deconstruction/re-use of structures materials", "Building and infrastructure documents", "Requalification plan development", "Implementation, control, monitoring (land back to market)", "Socio-economic assessment", "Funding and financing", "Decision-making and communication"). During the workshops, users identified as crucial the quantity and quality of information stored into the tool. Some users identified lacks of information for specific categories of information and for specific languages (i.e. German and Czech), or underlined that some links were not active anymore.

However, from the feedbacks collected through the questionnaires, the majority of the workshops' participants could find the information they were searching for and they confirmed they reached their search aims.

Nevertheless, in order to overcome the problems related to the underlined issue, the Information System developers and the TIMBRE partners spontaneously agreed to declare their commitment in further work to increase the number of web links stored into the web database and updating them, at least for one year, after the end of the project.

Additionally, it has to be considered that the Information System is expected to become a "living system" which will rely on direct end-users' inputs, evaluations and updates. Moreover, following the suggestions received by the workshops' participants, a functionality that allows users to update the web links into the tool has been implemented: according to this new functionality, when a web link becomes inactive, an alarm (i.e., a specific e-mail) will be sent to the user who inserted that web link in order to ask for the updating.

Furthermore, concerning the issue related to quantity and quality of information stored into the tool, it is worth underlining that the Information System, being an open centre for the collection and provision of information, will allow the access also to the set of tools and methods (and related documentation) developed in the TIMBRE project. In this way, the tool will include the project outcomes aimed at overcoming the existing barriers to a successful brownfield regeneration.

As far as the tool functionalities are concerned, both project partners and workshop participants underlined the need for functionalities that can allow expediting the search process. Taken into consideration the technical feasibility of the requests, the tool has been improved accordingly, allowing, for instance, the users to skip some steps during the use of the tool.

1.5.2 Collection of search aims

As reported above, one of the main aims of the organised workshops was to identify the most common “search aims” to be included in a list with the tool. When starting a new search, users will be invited to select a search aim from the list in the dedicated interface, or they will still be allowed to freely type their new search aim. The possible options included in the list have been derived from the search aims provided by partners and stakeholders during the testing activities. In order to develop this list, all the search aims provided by partners and stakeholders have been collected, analysed and divided on the basis of the different categories of stakeholders. Furthermore, considering that the initial lists of collected search aims includes more than 150 items, including many repetitions, a selection of search aims has been operated, avoiding repetitions and too specific indications, and choosing general and suitable search aims (e.g. information on reuse of building rubble, information on risk assessment, etc.).

The complete list of search aims is available in the dedicated software interface.

The developed list of search aims is one important aspect of the developed ANN methodology. When a user selects a search aim from the list, this information is used by the ANN methodology in order to select tailored web links on the basis of information evaluations provided by previous users who selected the same search aim. In this way the tool can provide tailored web links and information to users with the same needs.

1.5.3 A new name for the WP1 tool

Another issue that was raised both from TIMBRE partners and stakeholders referred to the name of the tool itself. The initial name of the tool was “Expert System as information platform for innovative and widely applicable strategies, technologies and solutions”, but lately it has been pointed out that this expression was too vague, and did not provide specific information about the features of the tool to possible users.

In order to overcome this problem, suggestions about possible alternative names have been requested from project partners, stakeholders and also to the TIMBRE International Advisory Board. The list of collected suggestions is reported below:

- “Timbre Information Network”;
- “Timbre Information System of Strategies, Technologies and Solutions”;
- “TIMBRE Information Expert System”;

- “TIMBRE Information System”;
- “TIMBRE Information Expert System”.

After internal WP1 discussion, it has been agreed among partners to adopt the expression: “TIMBRE Information System for Brownfield Regeneration”.

Summing up, it can be said that the involvement of the TIMBRE partners and the stakeholders through the Information System testing activities has been of crucial importance for a better tailoring of the tool. Both project partners and stakeholders provided useful feedbacks for the improvement of some functionalities of the tool. Moreover, their involvement and commitment in evaluating the accessed information allowed increasing the “knowledge base” of the Information System.

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Annex I: TIMBRE Information System for Brownfield Regeneration User Manual

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timbre

Tailored Improvement of
Brownfield Regeneration
in Europe

Timbre Information System

User Manual

Version 0.2 as of 28th February 2014

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A1 Introduction

The EU FP7 project Timbre – Tailored Improvement for Brownfield Regeneration in Europe (Contract-No. 265364, <http://www.timbre-project.eu/>) aims to support end-users in overcoming existing barriers in brownfield regeneration by developing and providing customised problem and target-oriented packages of technologies, approaches and management tools for a megasite reuse planning and remediation.

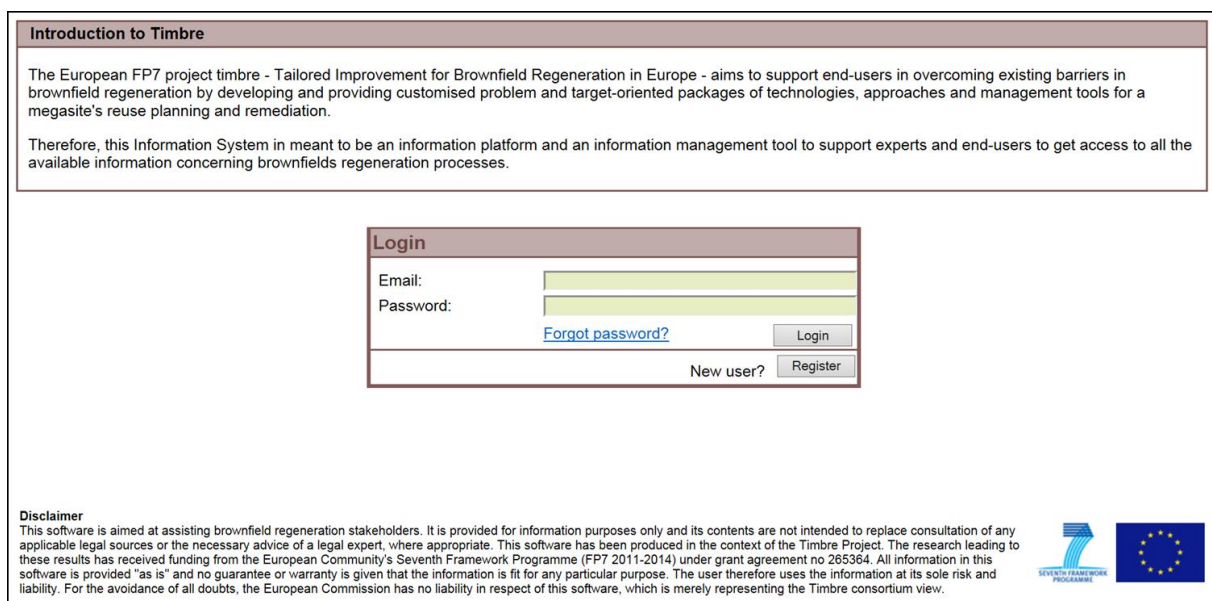
The TIMBRE Information System aims at supporting stakeholders in sharing and accessing the information they need for the different steps of the brownfield management process.

This manual aims at supporting stakeholders in using the definitive version (Version 0.2) of the TIMBRE Information System for Brownfield Regeneration (Information System in the following paragraphs).

The Information System includes a wide database of web links to documents on regulations, technical manuals, tools and case studies for brownfield regeneration. Web links can be uploaded and visualized by users through a framework encompassing all phases of the brownfield regeneration process. The system strongly relies on inputs from users, who are expected to upload and share new information, to search the database and to evaluate the outputs provided by the tool. An Artificial Neural Network methodology supports the ranking of the provided outputs considering a set of criteria, including for example the typology of user, his/her search aim, the country where to apply the needed information, the information categories of interest and the evaluation of documents provided by previous users.

A2 Timbre Information System quick start: registration and log in

Only registered users can access the Information System. To register it is necessary to go to the webpage <http://www.timbre-project.eu/informationssystem.html>, and click on “Register” to create a new account (Fig. 1).



The screenshot shows the 'Introduction to Timbre' page. It contains a paragraph about the project's aim and another about the Information System. Below this is a 'Login' form with fields for 'Email:' and 'Password:', a 'Forgot password?' link, and 'Login' and 'Register' buttons. At the bottom, there is a 'New user?' link and a 'Register' button. A 'Disclaimer' section at the bottom left explains the software's purpose and funding. Logos for the 'SEVENTH FRAMEWORK PROGRAMME' and the 'EUROPEAN UNION' are on the bottom right.

Introduction to Timbre

The European FP7 project timbre - Tailored Improvement for Brownfield Regeneration in Europe - aims to support end-users in overcoming existing barriers in brownfield regeneration by developing and providing customised problem and target-oriented packages of technologies, approaches and management tools for a megasite's reuse planning and remediation.

Therefore, this Information System is meant to be an information platform and an information management tool to support experts and end-users to get access to all the available information concerning brownfields regeneration processes.

Login

Email:

Password:

[Forgot password?](#)

Disclaimer
This software is aimed at assisting brownfield regeneration stakeholders. It is provided for information purposes only and its contents are not intended to replace consultation of any applicable legal sources or the necessary advice of a legal expert, where appropriate. This software has been produced in the context of the Timbre Project. The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7 2011-2014) under grant agreement no 265364. All information in this software is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose. The user therefore uses the information at its sole risk and liability. For the avoidance of all doubts, the European Commission has no liability in respect of this software, which is merely representing the Timbre consortium view.


SEVENTH FRAMEWORK PROGRAMME 

Figure 1. Information System page for new and registered users.

The registration procedure requires new users to fill in the fields in the web page showed in Figure 2. As mandatory data, the new user is required to indicate his e-mail address, to choose a password, and to indicate a preferred language and the stakeholder category/categories he belongs to.

As optional data, the new user can indicate his name, surname, and the organisation he works for. There is also a space for including additional information.



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New user registration

Mandatory data

Email:

Password:

Confirm Password:

Preferred language:

Please, indicate in which stakeholder category/categories you are included (more than one answer is possible):

<input type="checkbox"/> Site owner	<input type="checkbox"/> Technology provider
<input type="checkbox"/> Site neighbour	<input type="checkbox"/> Consultant
<input type="checkbox"/> Local authorities (town or city)	<input type="checkbox"/> Financier
<input type="checkbox"/> Regional and sub-regional government	<input type="checkbox"/> Contractor
<input type="checkbox"/> Regional and national regulator	<input type="checkbox"/> Insurer
<input type="checkbox"/> Public interest group	<input type="checkbox"/> End-user
<input type="checkbox"/> Developer/investor	<input type="checkbox"/> Media
<input type="checkbox"/> Local community group (neighbour-hood, districts)	<input type="checkbox"/> Scientific community and researcher
	<input type="checkbox"/> Other: <input type="text"/>

Optional data

Name:

Surname:

Organisation you work for:

Other:

Figure 2. Information System: registration procedure.

Once the registration procedure has been completed, the new user can access directly the first page of the Information System.

For accessing the Information System as registered user, it is necessary to go the webpage <http://www.timbre-project.eu//informationsystem.html> and to log in with the username and password.

In the next sections the procedures to explore and to use the Information System are illustrated, including how to search for and evaluate the collected information, how to upload new web links and how to modify and delete already existing web links.

A3 Search for information in the Information System

A3.1 Definition of the search aim and selection of the Country of interest

After the log in, for each search session the user is asked to indicate his specific search aim, that is, a specific information goal that the user wants to achieve when using the Information System (see Figure 3). This information is used by the tool to provide more tailored information to each user.

For each session, in the same web page, the user is also asked to indicate the country where the needed information is intended to be applied. Please note that this step is not compulsory, so the user can skip it by clicking on the button “Proceed”.

Which is your search goal?

Looking for information* on:

☐ BFs with the highest redevelopment potential
 ☐ Risk assessment

☐ BFs regeneration barriers;
 ☐ Characterization of soil and groundwater

☐ National strategies and guidelines for BF regeneration
 ☐ Remediation

☐ Stakeholders analysis
 ☐ Reuse of building rubble

☐ Social benefits and impacts of BFs
 ☐ Waste management and control

☐ Economic benefits of BFs
 ☐ Monitoring

☐ Rural redevelopment of BFs
 ☐ Funds for BF regeneration

☐ Ecological issues related to BF management (e.g., presence of biotope, type of biotope, value of biotope, protected species, red-list species)
 ☐ BF database (lists of BFs with related data, e.g. localization, area, typology, former/historical utilization, contamination, limitations in use, etc.)

☐ Residential redevelopment of BFs
 ☐ Best practices and successful case studies of BF regeneration

☐ (Land regeneration) Sustainable BF regeneration
 ☐ The adoption of Public Private Partnership strategies in BF management

☐ Planning (land use information, regional/urban land use plans)
 ☐ Other:

*i.e.: regulations/technical manuals/tools/case studies.

In which country (if any) are you going to apply the needed information?

Skip

Proceed

Figure 3. Definition of the search aim and selection of the country where to apply the needed information.

A3.2 Selection of information categories

After indicating his search aim and his country of interest, the user can visualise the framework for the collection of information on brownfield regeneration that is composed of 13 “information categories” corresponding to the different idealised phases of the brownfield regeneration process (see Figure 4). The definition of each information category can be visualised passing the cursor on the boxes. Furthermore, detailed instructions for this step are available in English by clicking on the button “Show Instructions” (indicated by a red circle in Figure 4).

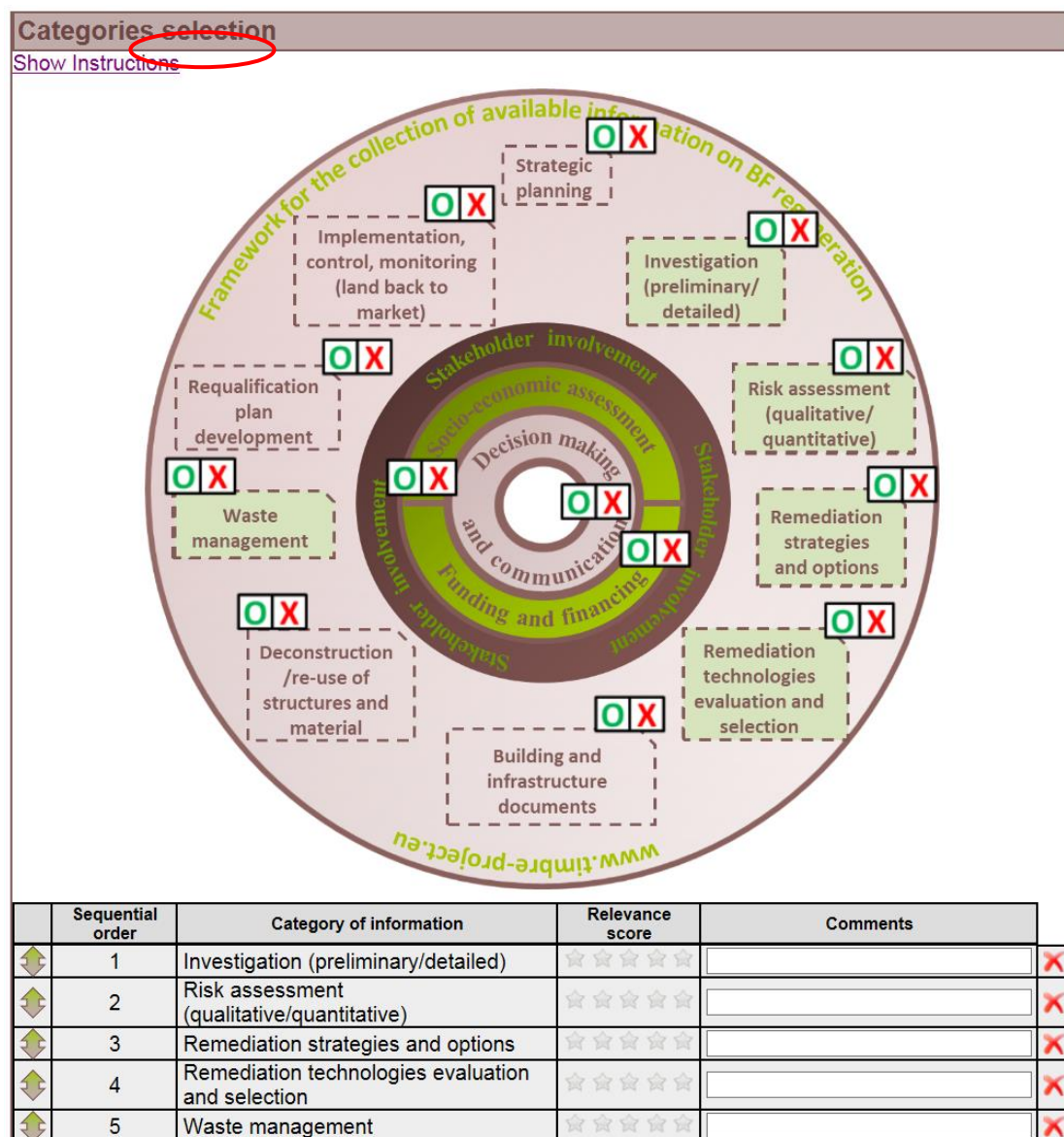


Figure 4. Selection of Information categories.

The above mentioned framework consists in a scheme where the main phases of the risk-based brownfield regeneration process correspond to “information categories” used to guide the collection/organisation and the consultation of the available information, in the form of web links. The user can select the information categories of interest for his search by clicking on the green checkmark close to each category. Selected categories turn to green (as shown in Figure 4). If the user wants to deactivate the already selected information categories, he can click on the red cross close to each category.

After selecting the information categories of interest, the system automatically lists them in the table below the framework. At this point the user can add or remove rows and the related information categories, and can change the sequential order of the selected information categories by dragging the rows. The selected order of categories will be reflected in the order of visualization of results.

Moreover, the user can give a relevance score to each category (from 1 to 5, by selecting the corresponding stars), according to the relevance that each category has in his search (see Figure 5). This information is used in the ranking methodology to tailor the ranking of provided results according to user’s preferences. The user can also add, if needed, some comments to each information category.

Please note that this step is not compulsory, so the user can skip it by clicking on the button “Skip”.






	Sequential order	Category of information	Relevance score	Comments	
	1	Investigation (preliminary/detailed)	★★★★☆	<input type="text"/>	✗
	2	Risk assessment (qualitative/quantitative)	★★★★☆	<input type="text"/>	✗
	3	Remediation strategies and options	★★★★☆	<input type="text"/>	✗
	4	Remediation technologies evaluation and selection	★★★★☆	<input type="text"/>	✗
	5	Waste management	★★★☆☆	<input type="text"/>	✗

Figure 5. Definition of Information categories – table details: example of selected information categories with relative Sequential order and Relevance score.

A3.3 Visualisation of results

Stakeholders may have different specific needs when using the Information System, according to their work tasks, their experience, the regulatory context they are operating in, etc. The distinctive objective of the Information System is to provide each end-user with the most suitable information about regulation, approaches, methodologies, and tools for each of the main phases of the brownfield regeneration process, meeting his/her specific characteristics, requirements and needs in the most tailored way.

According to this objective, the Information System is meant to be not only a database, but rather a user-friendly search tool that provides the users with tailored lists of web links ordered by relevance on the basis of specific criteria set by the user when performing his/her search.

This paragraph illustrates how the Information System provides the results of a search session (i.e., a ranked list of web links) and how the user can explore these results. Moreover the Artificial Neural Networks (ANN) methodology implemented in the system for ranking the search results is briefly explained (see Box 1).

After clicking the “Proceed” button in the page for selecting the categories, the user can access the page with the list of the web links provided as outputs of his search session, ranked according to the criteria used in the Artificial Neural Networks (ANN) methodology (see Figure 6). These web links belong to the information categories selected in the previous stage and are listed according to the sequential order indicated by the user. The selected information categories are also listed on the left side of the web page and appear in a darker brown colour, while other categories appear in a lighter colour.

Timbre > explore > All - Regulation admin - Logout

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timbre information system
 the timbre project: <http://www.timbre-project.eu/>

search into the database Help

Links Control Panel Insert new item

Start new search Country of reference: All

All **Regulation** Technical manuals Tools Case studies

All **Category: Investigation (preliminary/detailed)**

	Subcategory	Country of reference	Application scale	Title of the document (english)	Description of the document (english)	Original language link	English Version link	Other languages link	Rating
Investigation (preliminary/detailed)	Preliminary and Detailed	Germany	European	Federal Soil Protection Act of 17 March 1998	German federal law for soil protection and contaminated sites	German version	English version	-	★★★★★ Evaluations: 1 Inappropriate: 1 Total visits: 1
Risk assessment (qualitative/quantitative)	Preliminary and Detailed	Italy	National	Legislative Decree nr. 152 of 3rd of April 2006.	Italian national legislative decree for environment protection.	Italian version	-	-	★★★★★ Evaluations: 1 Inappropriate: 0 Total visits: 1
Remediation strategies and options	Preliminary and Detailed	Austria	National	Federal Law on Remediation of Contaminated Sites of 7 June 1989	Legal basis for the registration of contaminated sites and the funding for their containment / remediation. Regulates the definition of terms, the contribution to the Fund for Contaminated Sites, the standard procedures for the registration and assessment of suspected contaminated sites, the basic conditions for clean-up and the responsibilities.	German version	-	-	★★★★★ Evaluations: 1 Inappropriate: 0 Total visits: 1
Remediation technologies evaluation and selection	Preliminary and Detailed	Austria	National	ÖNORM S 2090: Sampling of soil gas	Norm for the sampling of soil gas regarding volatile and gaseous organic and inorganic matter. Requirements for sampling procedure, conservation and transport of the samples, as well as for sample preparation, analytical method and documentation. (purchase required)	German version	-	-	★★★★★ Evaluations: 1 Inappropriate: 0 Total visits: 0
Waste management	Preliminary and Detailed	Austria	National	ÖNORM S 2091: Contaminated sites - Sampling of solids - Sampling of solids from waste deposits and industrial sites	Requirements for solid sampling (e.g. soil, subsoil) in connection with the investigation or remediation of contaminated sites. (purchase required)	German version	-	-	★★★★★ Evaluations: 1 Inappropriate: 0 Total visits: 0
Strategic planning									
Building and infrastructure documents									
Deconstruction/re-use of structures materials									
Requalification plan development									
Implementation, control, monitoring (land back to market)									
Socio-economic assessment									
Funding and financing									
Decision-making and communication									

Figure 6. Results of a search session: list of web links to relevant documents on brownfield regeneration selected and ranked according to the ANN methodology.

Within each information category, the web links are further subdivided according to the typology of documents in “Regulation”, “Technical manuals”, “Tools” and “Case-studies”. The search results in the category “Regulation” are shown on the top by default, then the user can move to another typology by clicking on the corresponding button on the bar.


For each document, the following information are visible in the output table:


- *Country of reference,*
- *application scale* (“European”, “National”, “Regional”, “Local” or “Not applicable”),
- *title of the document in English;*
- *description with key words in English;*
- *link to the original version of the document;*
- *link to the English version (if present);*
- *link to other versions (if present).*

Finally, on the right side of the web links, it is possible to visualise the average of the ratings attributed by previous users to the document, the number of evaluations obtained by the web link, the number of times that a web link has been considered not appropriate and the total number of visits. Even one judgement of inappropriateness, given to one web link, is visualised in red (Fig 7). For further information about the evaluation of documents, see paragraph 4.

admin - Logout

ending from the
network
agreement no.





Help

search into the database

Search

Insert new item

s Case studies

Country of reference:

All ▼




Document	Description of the document (english)	Original language link	English Version link	Other languages link	Rating
Standardised procedures for investigation, assessment and remediation of waste deposits and industrial sites	This ÖNORM describes the general procedure for investigation, assessment and remediation of waste deposits and industrial sites	German version	-	-	<div><div></div><div>Evaluations: 20 Inappropriate: 1</div></div> <div></div>

Figure 7. Example of a web link that has been considered inappropriate by one user.

If the user wants to visualise links to documents specifically developed in/for a particular country, he can refine his search using the functionality “Country of reference” on the top right corner of the screen that works like a filter on the provided search outputs (see the red circle in Figure 8).

Box 1. Concise explanation of the Artificial Neural Networks (ANN) ranking methodology implemented in the system.

An Artificial Neural Network (ANN) is a mathematical model inspired by biological neural networks and consists of an interconnected group of artificial neurons (i.e., mathematical functions). The ANN model processes information using prior knowledge of the modelled event which is collected during the so called “learning phases” (in the case at hand, special user sessions which provide the system with information on how to evaluate and rank the collected information). In addition to the “learning sessions”, the ANN model implemented in the Information System can “learn” from each search session performed by individual users. In this way, the ANN methodology for ranking the web links included in the Information System database allows to have a system with the ability to continuously learn from past search sessions in order to improve and refine the ranking of new results.

The methodology uses a set of information collected during each user search session as reported in Table 1. The description of each input is reported in the next paragraph.

Table 1. Inputs for the ANN methodology

User related	Session related	Scores	Statistics
Preferred language	Aim of search	Pertinence to user's search aim	Number of clicks from same stakeholder category
Stakeholder categories	Country of reference	Appropriateness for category of information	Total number of clicks
	Selected information categories	Usefulness	
	Scores of information categories	Clarity	
	Typology of information	Reliability and accuracy	
		Updating	

Description of input data, when they are acquired and used

“User related” inputs are data provided by the users during registration to the Information System. They refer to specific user’ characteristics stored on his/her profile page (which can be updated/modified as needed). More specifically these inputs are:

- “Preferred language”: the user is asked to indicate the preferred language when searching for information. According to this selection the system provides a list of web links where documents are written in the user’s preferred language. The subsequent links refer to material written in English, and afterwards in other languages.
- “Stakeholder category/ies the user belongs to”: this information is used by the system in order to provide the user with the most visualized web links by previous users belonging to the same typology of stakeholders.

“Session related” inputs are provided by the user during each search session, thus they can change for the same user from session to session and depend on the specific tasks he/she is using the Information System for. These inputs are the following:

- “Aim of search”: for each session the user is asked to indicate his/her search aim when using the Information System. This information is used to provide tailored information to the user. A list of search aims will be provided and the users can choose one option from the list or indicate a new particular search aim.
- “Country of reference”: for each session, the user is asked to indicate the country where the needed information is intended to be applied. This information will affect the results (ranking of web links), which will be provided in the following order: first the links related to the selected country (including links to documents/materials written in the selected country’s language), then web links referring to the language indicate by the user as the preferred one, then links to material written in English, and finally in other languages.
- “Selected information categories”: in each session, the user is asked to select the information categories of the framework which are related to his/her main search aim.
- “Scores of information categories”: after selecting the information categories, the user is asked to evaluate them, assigning a score from 1 to 5 (where 1 is associated to the worst evaluation and 5 to the best evaluation) according to his/her personal preferences and expertise.
- “Typology of information”: after the selection of the information categories the user can select also the typology of information of interest, choosing among “Regulation”, “Technical manuals”, “Tools” and “Case studies”.

“Scores” inputs refer to the evaluation of the web links contents (i.e., associated documents) provided by each user at the end of a search session according to the following criteria:

- “Pertinence”: the user is asked to specify if a specific web link’s information is pertinent and related with his/her previously defined aim of search (yes/no answer);
- “Appropriateness”: the user is asked to indicate if a specific web link’s information is appropriate for the previously indicated information category/ies (yes/no answer);
- “Usefulness”: the user is asked to evaluate the level of usefulness of the web link information in achieving the specific aim of search (score: from 1 to 5, where 1 is associated to the worst evaluation and 5 to the best evaluation);
- “Clarity”: the user is asked to evaluate the level of clarity of the web link information, considering the description of concepts and the use of specific vocabulary (score: from 1 to 5, where 1 is associated to the worst evaluation and 5 to the best evaluation);
- “Reliability and accuracy”: the user is asked to evaluate the level of reliability and, consequently, accuracy of the information that can be evaluated considering the quality and the trustworthiness of the source of information (score: from 1 to 5, where 1 is associated to the worst evaluation and 5 to the best evaluation);
- “Updating”: the user is asked to evaluate the level of topicality of the information and the compliance with the latest regulatory frameworks (score: from 1 to 5, where 1 is associated to the worst evaluation and 5 to the best evaluation).

These evaluation scores are stored by the system and used to refine the ranking in search sessions performed by following users.

Finally, the last inputs are referred to “Statistics”:

- Number of clicks received by a web link from users belonging to the same stakeholder category: it indicates the level of interest from the same stakeholder category for that web link.
- Total number of clicks: it indicates the level of interest for a particular web link.

Timbre > explore > All - Regulation admin - Logout

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timbre information system
 the timbre project: <http://www.timbre-project.eu/>

search into the database Search

Links Control Panel Insert new item

Country of reference: All

Start new search	All	Regulation	Technical manuals	Tools	Case studies
All	Category: Investigation (preliminary/detailed)				
Investigation (preliminary/detailed)	Subcategory	Country of reference	Application scale	Title of the document (english)	Description of the document (english)
Risk assessment (qualitative/quantitative)	Preliminary and Detailed	Germany	European	Federal Soil Protection Act of 17 March 1998	German federal law for soil protection and contaminated sites
Remediation strategies and options	Preliminary and Detailed	Italy	National	Legislative Decree nr. 152 of 3rd of April 2006.	Italian national legislative decree for environment protection.
Remediation technologies evaluation and selection					
Waste management					
Strategic planning	Preliminary and Detailed	Austria	National	Federal Law on Remediation of Contaminated Sites of 7 June 1989	Legal basis for the registration of contaminated sites and the funding for their containment / remediation. Regulates the definition of terms, the contribution to the Fund for Contaminated Sites, the standard procedures for the registration and assessment of suspected contaminated sites, the basic conditions for clean-up and the responsibilities.
Building and infrastructure documents					
Deconstruction/re-use of structures materials					
Requalification plan development	Preliminary and Detailed	Austria	National	ÖNORM S 2090: Sampling of soil gas	Norm for the sampling of soil gas regarding volatile and gaseous organic and inorganic matter. Requirements for sampling procedure, conservation and transport of the samples, as well as for sample preparation, analytical method and documentation. (purchase required)
Implementation, control, monitoring (land back to market)					
Socio-economic assessment					
Funding and financing					
Decision-making and communication	Preliminary and Detailed	Austria	National	ÖNORM S 2091: Contaminated sites - Sampling of solids - Sampling of solids from waste deposits and industrial sites	Requirements for solid sampling (e.g. soil, subsoil) in connection with the investigation or remediation of contaminated sites. (purchase required)

Figure 8. Functionalities for exploring the provided results: “Search by keyword” (blue circle) and “selection by Country of reference” (red circle).

The user can perform a search by keywords among the provided results. To this purpose, it is possible to type the word of interest in the box “Search into the database” and then click the button “Search” (see the blue circle in Figure 8).

Finally, if the user wants to extend his search to another information category, besides the already selected information categories, he can click on the category of interest from the list on the left side. At this point, a pop up asking if the “search aim” has been changed is visualised (see Figure 9).

If the user selects “No”, the web links included in the new information category are visualised; if he wants to include these results into the previous list, he has to click on the “All” button (at the top of the categories).

If the user selects “Yes” in the pop up, the system redirects the user to the “Search aim” web page, where he can indicate the new search aim (see Figure 3).

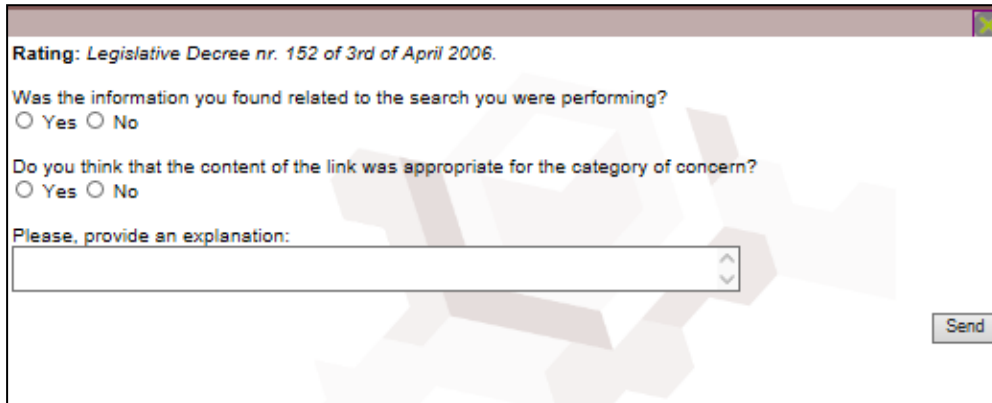
The screenshot displays the 'timbre information system' interface. At the top, there is a navigation bar with links for 'Start new search', 'All', 'Regulation', 'Technical manuals', 'Tools', and 'Case studies'. A search bar is located at the top right with the text 'search into the database' and a 'Search' button. Below the navigation bar, a table lists search results. The table has columns for 'Category', 'Subcategory', 'Country of reference', 'Applicable scale', 'Title of the document (english)', 'Description of the document (english)', 'Original language link', 'English version link', 'Other languages link', and 'Rating'. A pop-up dialog titled 'Start new search?' is overlaid on the table, asking 'Do you want to change your search aims?' with three buttons: 'Yes', 'No', and 'No, do not ask again'.

Category	Subcategory	Country of reference	Applicable scale	Title of the document (english)	Description of the document (english)	Original language link	English version link	Other languages link	Rating
Investigation (preliminary/detailed)	None	Italy	National	Legislative Decree nr. 152 of 3rd of April 2006	Italian national legislative decree for environment protection	Italian version			5 stars
Risk assessment (qualitative/quantitative)	None	Germany	National	Act against Harmful Change and on Rehabilitation of Contaminated Sites (Federal Soil Protection Act - BodSchG) of 17 March 1990, Version of 24 February 2011		German version	English version		5 stars
Remediation strategies and actions	None	Italy	National	Ministerial Decree nr. 161 of 24 August 2012	obtained from excavation activities	Italian version			5 stars
Waste management	None	Germany	National	Act on the Order of the Waste (WHG) of 31 July 2009, Last version of 24 February 2012		German version			5 stars
Strategic planning	None	Germany	European	European List of Wastes Ordinance of 10.12.2001 (AVV)	European List of Wastes Ordinance	German version			5 stars
Building and infrastructure documents	None	Germany	National	Waste Oil Ordinance of 27.10.1997 (Altölv)	German Waste Oil Ordinance	German version			5 stars
Deconstruction/re-use of structures materials	None	Poland	National	The construction Law of 7 in of July 1994	This document establishes principles of deconstruction activities.	Polish version			5 stars
Regulation plan development	None	Poland	National	Act on waste	This document regulates the principles of management of wastes from demolitions.	Polish version			5 stars
Implementation, control, monitoring (and back to market)	None	Poland	National	Regulation on the levels of recycling preparation for re-use and recovery in other methods of some fraction of municipal waste	This document applies also to construction wastes from the municipal sector. It orders to increase levels of recycling, preparation of re-used recovery and recovery by other methods to 70% in 2020.	Polish version			5 stars
Socio-economic assessment	None	Switzerland	National	Technical Ordinance of Waste	Swiss ordinance dealing with disposal and re-use of waste, 10 December 1990	German version	French version		5 stars
Funding and financing	None	Czech Republic	National	Act No. 157/1998 Sb. on chemical matters and chemical formulations	The object of the Act is to establish rights and obligations of legal entities and natural persons in determining the properties and classification of chemical substances and chemical preparations, at registration, recording, reporting, handling and marketing, defining the scope of the administrative authorities in ensuring the protection of human health and the environment from the harmful effects of chemicals and chemical products and determination of competence of professional supervision over compliance with the provisions of this Act	Czech version			5 stars
Decision-making and communication	None	Italy	Regional	Operative procedures defining how to use soil and rocks obtained from excavation activities.	Operative procedures defining how to use soil and rocks obtained from excavation activities (Dgr. 2424 - Veneto Region)	Italian version			5 stars

Figure 9. “Start new search?” pop up.

A4 Evaluation of information

After selecting a specific web link, a window for the evaluation of the document related to this link appears (Figure 10). The evaluation provided by the user will be saved into the system and appropriately elaborated to support the ranking of the results of future search sessions .



The screenshot shows a web-based evaluation form. At the top, it displays the text "Rating: Legislative Decree nr. 152 of 3rd of April 2006." Below this, there are two questions, each with "Yes" and "No" radio button options. The first question is "Was the information you found related to the search you were performing?". The second question is "Do you think that the content of the link was appropriate for the category of concern?". Below these questions is a text input field with the placeholder text "Please, provide an explanation:". To the right of the input field is a "Send" button. The background of the window features a faint, stylized map of Europe.

Figure 10. Information System window for the evaluation of the information.

The first two questions asked to users are the following ones:

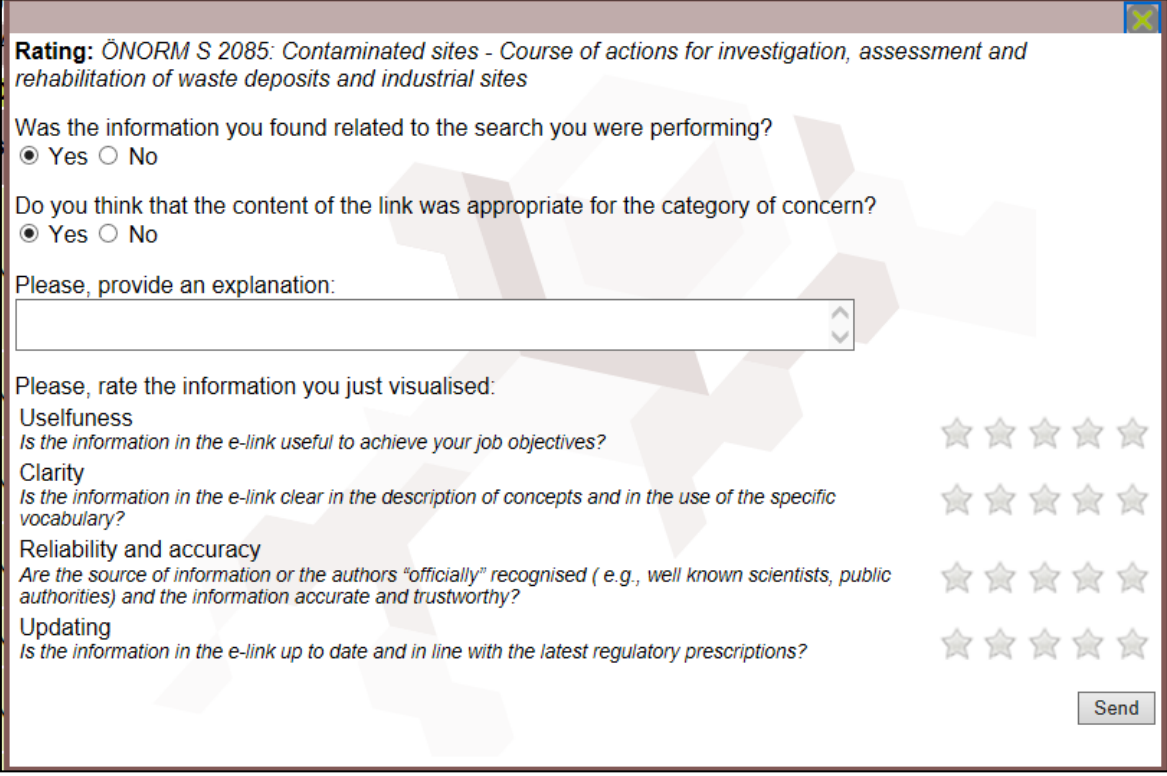
- *Was the information you found related to the search you were performing?*
- *Do you think that the content of the link was appropriate for the category of concern?*

If the user answers "No" to the second question, a notification will be associated to the web-link underling that the web-link has been evaluated as inappropriate (See Fig. 7).

If users answer "Yes" to both of the question, the system asks the user to evaluate the information according to the following criteria (see Box 1 for definitions):

- Usefulness;
- Clarity;
- Reliability and accuracy";
- Updating.

For each criteria, the user can indicate a score from 1 to 5 (by selecting the stars), where 1 is associated to the worst evaluation and 5 to the best evaluation.



Rating: *ÖNORM S 2085: Contaminated sites - Course of actions for investigation, assessment and rehabilitation of waste deposits and industrial sites*

Was the information you found related to the search you were performing?
☒ Yes ☐ No

Do you think that the content of the link was appropriate for the category of concern?
☒ Yes ☐ No

Please, provide an explanation:

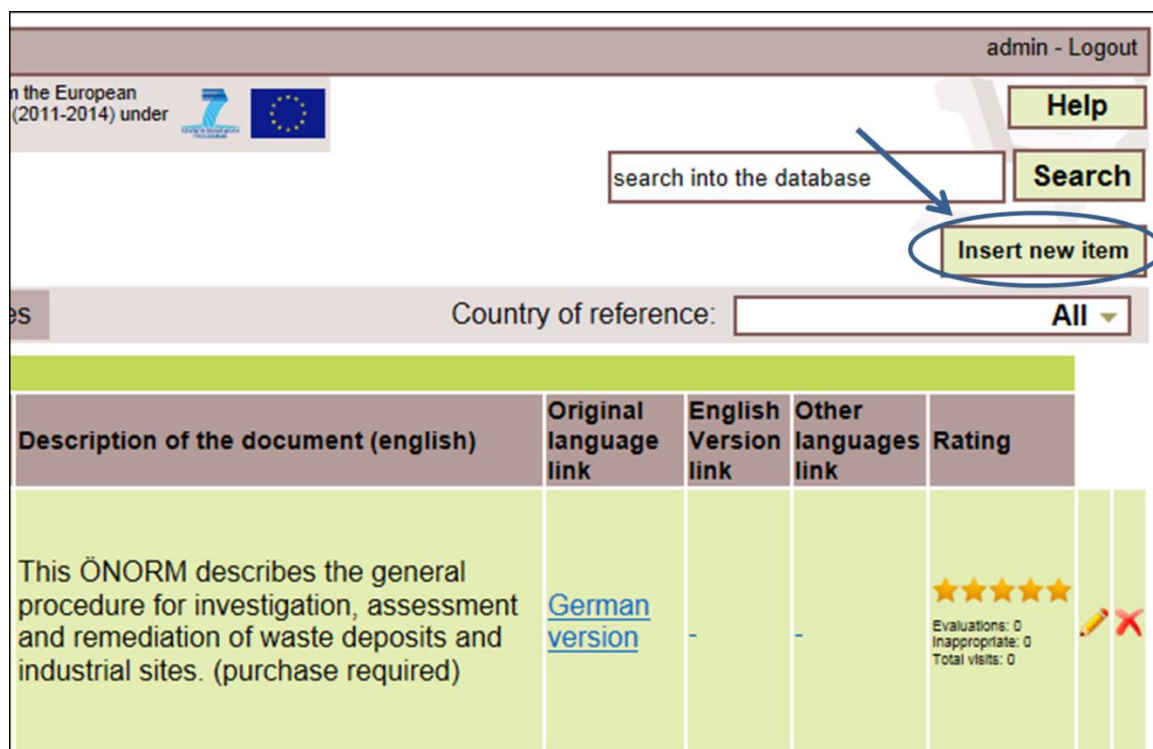
Please, rate the information you just visualised:

Usefulness <i>Is the information in the e-link useful to achieve your job objectives?</i>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Clarity <i>Is the information in the e-link clear in the description of concepts and in the use of the specific vocabulary?</i>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Reliability and accuracy <i>Are the source of information or the authors "officially" recognised (e.g., well known scientists, public authorities) and the information accurate and trustworthy?</i>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Updating <i>Is the information in the e-link up to date and in line with the latest regulatory prescriptions?</i>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

Figure 11. Information System window for the evaluation of information (in the figure, an example of evaluation of a regulation).

A5 Add new information

A registered user can upload his own web links with related information into the Information System, categorising them according to the information categories and documents types available in the tool. To this end, the button “Insert new item” can be used (Figure 12).



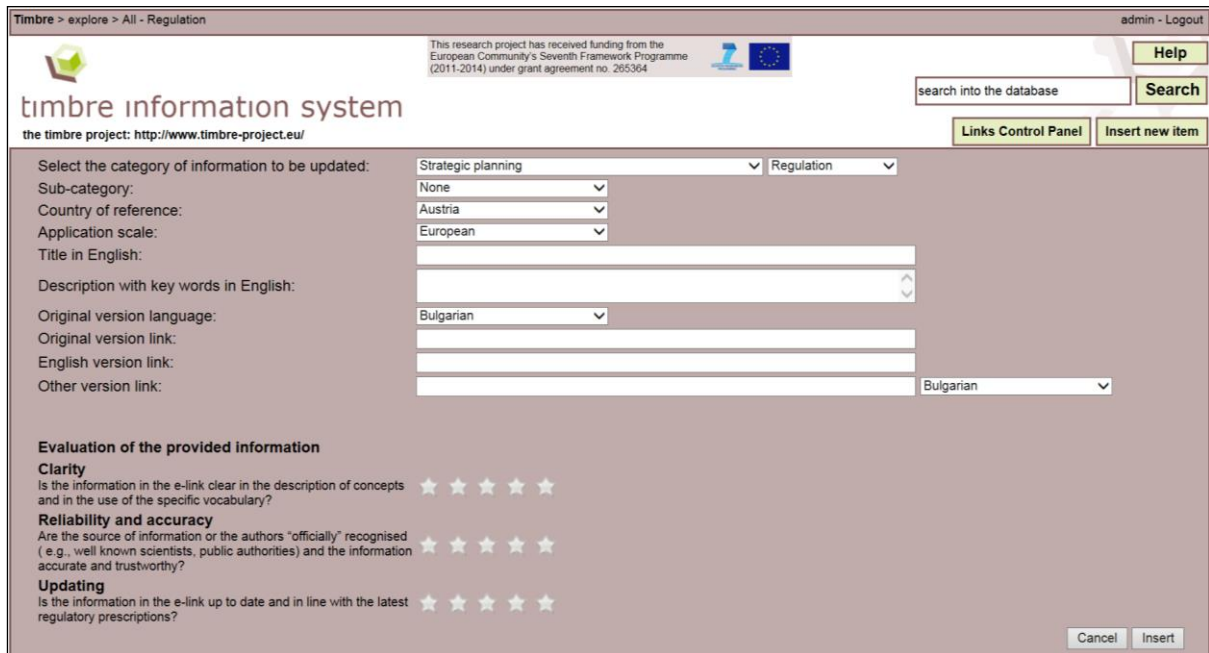
The screenshot shows the top navigation bar with 'admin - Logout' and a 'Help' button. Below this is a search bar with the placeholder text 'search into the database' and a 'Search' button. The 'Insert new item' button is located below the search bar and is highlighted with a red circle. An arrow points from the search bar area to the 'Insert new item' button. Below the search bar is a 'Country of reference:' dropdown menu with 'All' selected. The main content area features a table with the following structure:

Description of the document (english)	Original language link	English Version link	Other languages link	Rating
This ÖNORM describes the general procedure for investigation, assessment and remediation of waste deposits and industrial sites. (purchase required)	German version	-	-	★★★★★ Evaluations: 0 Inappropriate: 0 Total visits: 0

Figure 12. Functionality to add new information.

By clicking on the button “Insert new item”, a window for including new information is popping-up, as displayed in Figure 13. This Information System functionality allows the user to include new web links as well as to provide an evaluation of the provided document/information.

At this stage, the evaluation is based on three of the four criteria already mentioned in Paragraph 4 (specifically: “Clarity”, “Reliability and accuracy” and “Updating”). The “Usefulness” criteria is not considered at this point, because only a general evaluation of the provided information is required, which is not related to a specific “search aim”.



The screenshot shows the 'timbre information system' interface. At the top, there is a navigation bar with 'Timbre > explore > All - Regulation' and a user login 'admin - Logout'. A banner mentions funding from the European Community's Seventh Framework Programme (2011-2014) under grant agreement no. 265364. The main form is titled 'timbre information system' and includes a URL 'the timbre project: http://www.timbre-project.eu/'. It features a search bar and buttons for 'Help', 'Search', 'Links Control Panel', and 'Insert new item'. The form fields include: 'Select the category of information to be updated:' (Strategic planning), 'Sub-category:' (None), 'Country of reference:' (Austria), 'Application scale:' (European), 'Title in English:', 'Description with key words in English:', 'Original version language:' (Bulgarian), 'Original version link:', 'English version link:', 'Other version link:', and 'Evaluation of the provided information' (Clarity, Reliability and accuracy, Updating) with star ratings. At the bottom right are 'Cancel' and 'Insert' buttons.

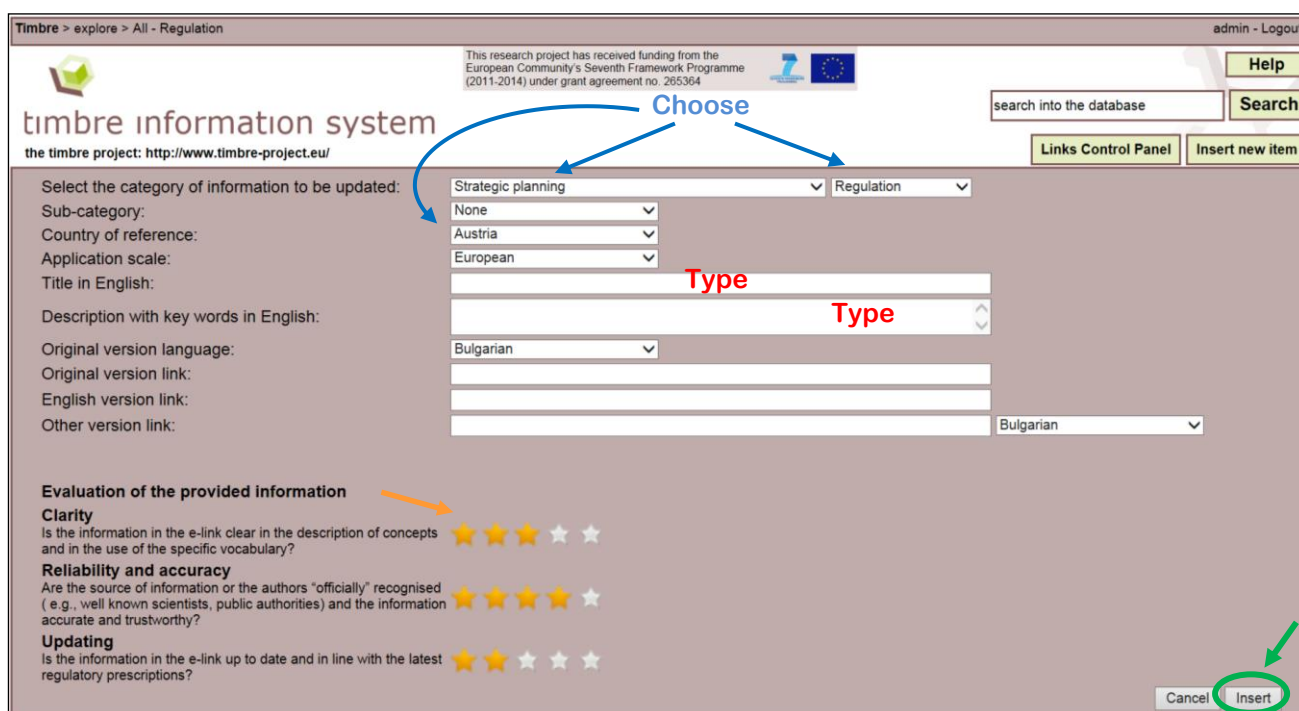
Figure 13. Window for entering new information within the Information System.

Figure 13 shows the information that the user is asked to include for each of the document/item he wants to add to the web database:

- category of information;
- typology of information;
- sub-category of information (available only for some categories: for “Investigation” it is possible to select “Preliminary”, “Detailed” or “Preliminary and Detailed”; for “Risk assessment” it is possible to select “Qualitative”, “Quantitative” or “Qualitative and Quantitative”);
- Country of reference;
- application scale (the following options can be selected: “European”, “National”, “Regional”, “Local” or “Not applicable” according to the applicability of the information/documents/regulations/tools to different contexts);
- title in English;
- description with key words in English;
- language of the original version of the document;
- link to the original version;
- link to the English version (if present);
- link to other version(s) (if present).

For some fields (e.g., Country of reference), a list of alternatives is available through a drop-down menu. For other fields (e.g., description with key word in English), users can type the required information in the windows (Figure 14).

Once all fields have been filled in and the evaluation is completed, it is necessary to click “Insert” in order to complete the procedure and upload the information in the Information System (Figure 14).



The screenshot shows the 'Timbre information system' interface. At the top, there is a navigation bar with 'Timbre > explore > All - Regulation' and a user profile 'admin - Logout'. A banner mentions funding from the European Community's Seventh Framework Programme (2011-2014) under grant agreement no. 265364. The main form is titled 'timbre information system' and includes the URL 'http://www.timbre-project.eu/'.

The form contains several sections:

- Select the category of information to be updated:** This section has two dropdown menus. The first is set to 'Strategic planning' and the second to 'Regulation'. A blue arrow labeled 'Choose' points to these dropdowns.
- Sub-category:** A dropdown menu set to 'None'.
- Country of reference:** A dropdown menu set to 'Austria'.
- Application scale:** A dropdown menu set to 'European'.
- Title in English:** A text input field.
- Description with key words in English:** A large text area with a red 'Type' label.
- Original version language:** A dropdown menu set to 'Bulgarian'.
- Original version link:** A text input field.
- English version link:** A text input field.
- Other version link:** A text input field.
- Evaluation of the provided information:** This section contains three evaluation criteria, each with a star rating:
 - Clarity:** 'Is the information in the e-link clear in the description of concepts and in the use of the specific vocabulary?' (4 stars).
 - Reliability and accuracy:** 'Are the source of information or the authors "officially" recognised (e.g., well known scientists, public authorities) and the information accurate and trustworthy?' (5 stars).
 - Updating:** 'Is the information in the e-link up to date and in line with the latest regulatory prescriptions?' (4 stars).

At the bottom right, there are two buttons: 'Cancel' and 'Insert'. A green arrow points to the 'Insert' button, which is circled in green.

Figure 14. Window for entering and evaluating new information within the Information System with the different input options.

If the internet link is referred to a tool/technology within the category of information “Remediation strategies and options”, it is necessary to add “Additional information” in order to provide to end-users with more specific and detailed technical information on that particular remediation tool/technology. In Figure 15, the set of additional data required by the Information System is displayed. Also in this case, at the end of the process it is necessary to evaluate the information and to click “Insert” in order to complete the procedure and upload the information in the tool.

Additional Information	
Technology name:	<input type="text"/>
Technology type:	<input type="checkbox"/> In situ <input type="checkbox"/> Ex situ <input type="checkbox"/> Ex situ – On site <input type="checkbox"/> Ex situ – Off site
Environmental medium	<input type="checkbox"/> Soil <input type="checkbox"/> Sediments <input type="checkbox"/> Groundwater
Target contaminants and performance (%)	
NH VOC Nonhalogenated volatile organic compounds:	<input type="text"/>
H VOC Halogenated volatile organic compounds:	<input type="text"/>
NH SVOC Nonhalogenated semivolatile organic compounds:	<input type="text"/>
HS VOC Halogenated semivolatile organic compounds :	<input type="text"/>
Inorganics (e.g. cyanide, sulfur, asbestos):	<input type="text"/>
Metals / metalloids (e.g. Copper 25%, Iron 40%, etc.):	<input type="text"/>
Fuels:	<input type="text"/>
Radionuclides:	<input type="text"/>
Explosives:	<input type="text"/>
Technology applicability conditions	
Annual average temperature (°C):	<input type="text"/>
Remediation technology time scale:	<input type="text"/> Weeks <input type="button" value="v"/>
Max achievable soil depth (m):	<input type="text"/>
Nature of soil:	<input type="checkbox"/> Gravel <input type="checkbox"/> Sand <input type="checkbox"/> Silt <input type="checkbox"/> Clay
Range of suitable organic carbon (e.g. 10 – 30 %; < 30%; > 10 %):	<input type="text"/>
Costs:	<input type="text"/> €/m3 <input type="button" value="v"/>

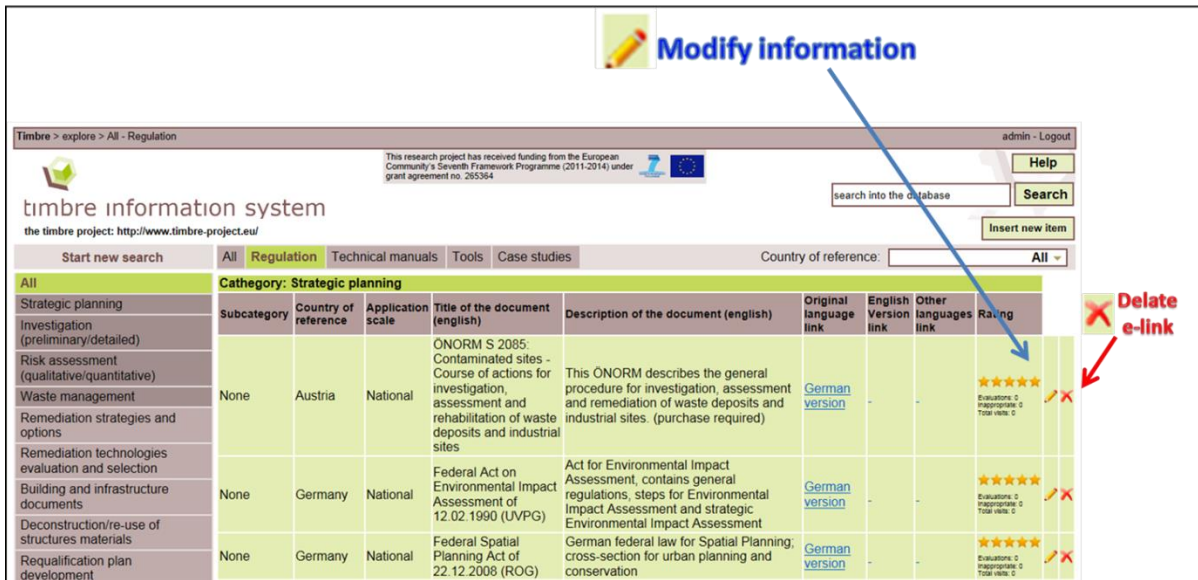
Figure 15. Additional information required for inserting documents related to a tool/technology in the category of information “Remediation strategies and options”.

A6 Modify or delete information

If users need to modify some details referred to the internet links already inserted into the Information System, it is possible to use the icon “pencil” on the right side of the record line (Figure 16).

If, instead, it is necessary to delete an internet link with the associated information, it possible to click on the “red cross” on the right side to erase the link from the system.

The revision and removal of information collected in the Information System can be performed by the user who uploaded the information, by the administrator of the system, as well as by some users identified as “Expert users” (see Paragraph 8).




The screenshot shows the 'timbre information system' interface. At the top, there is a navigation bar with 'Timbre > explore > All - Regulation' and a user login 'admin - Logout'. Below this is a search bar with the text 'search into the database' and a 'Search' button. A 'Help' button is also present. The main content area displays a table of records under the 'Regulation' category. The table has columns for 'Subcategory', 'Country of reference', 'Application scale', 'Title of the document (english)', 'Description of the document (english)', 'Original language link', 'English Version link', 'Other languages link', and 'Rating'. Three records are visible, each with a 'pencil' icon for modification and a 'red cross' icon for deletion. A blue arrow points to the 'pencil' icon, and a red arrow points to the 'red cross' icon, both labeled with text boxes.

Subcategory	Country of reference	Application scale	Title of the document (english)	Description of the document (english)	Original language link	English Version link	Other languages link	Rating
Investigation (preliminary/detailed)	None	Austria	National	ONORM S 2085: Contaminated sites - Course of actions for investigation, assessment and rehabilitation of waste deposits and industrial sites.	German version	-	-	★★★★★ Evaluations: 0 Inappropriate: 0 Total votes: 0
Risk assessment (qualitative/quantitative)	None	Germany	National	Federal Act on Environmental Impact Assessment, 12.02.1990 (UVPG)	German version	-	-	★★★★★ Evaluations: 0 Inappropriate: 0 Total votes: 0
Waste management	None	Germany	National	Federal Spatial Planning Act of 22.12.2008 (ROG)	German version	-	-	★★★★★ Evaluations: 0 Inappropriate: 0 Total votes: 0

Figure 16. Icons to modify and delete information.

A7 Password recovery and modification

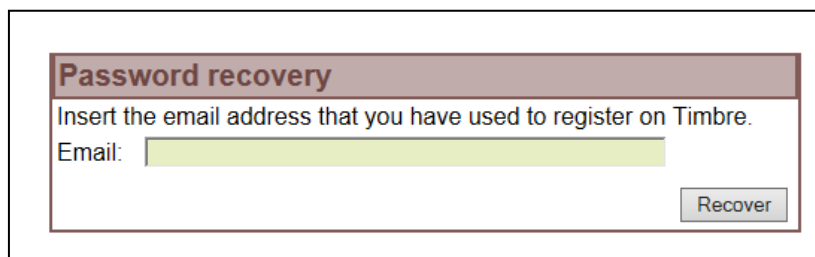
In the log-in window, a functionality for the recovery of the forgotten password is included (see red circle in Figure 17).



The image shows a login form titled "Login". It contains two input fields: "Email:" and "Password:". Below the "Password:" field, there is a blue link labeled "Forgot password?" which is circled in red. To the right of the "Forgot password?" link is a "Login" button. Below the "Forgot password?" link and the "Login" button is a "New user?" label and a "Register" button.

Figure 17. Link for the password recovery.

Clicking on the "Forgot password" link, a window for the insertion of the e-mail address for the password recovery will be displayed, as reported in Figure 18.



The image shows a form titled "Password recovery". It contains a text input field labeled "Email:" and a "Recover" button.

Figure 18. Password recovery.

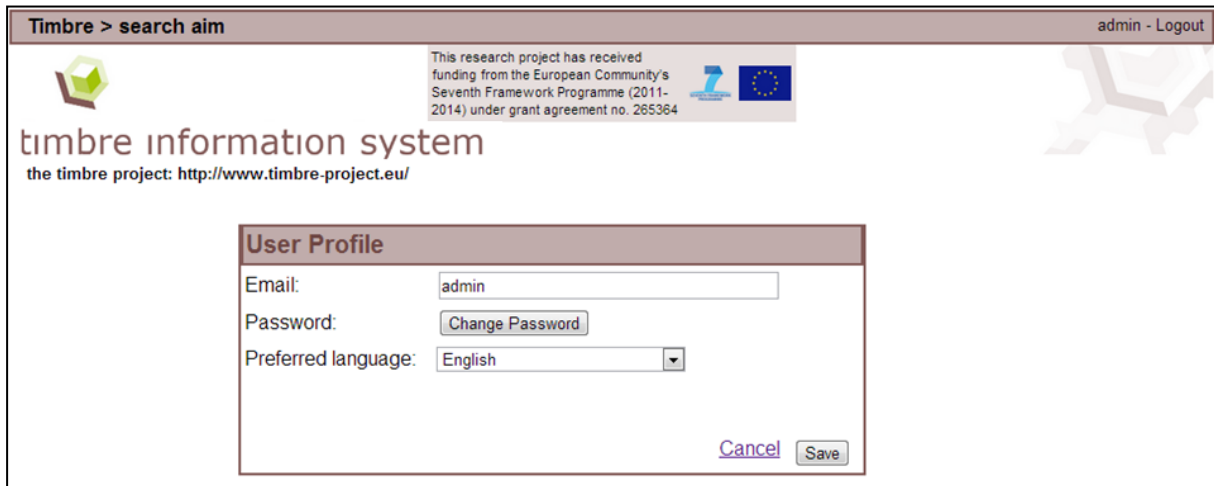
The "Recover" button in Figure 18 will send an e-mail with a temporary password. The temporary password need to be changed as soon as possible. The functionality to change the password can be found clicking on the user-related link which is present on the upper right side of each Information System window (see red circle in Figure 19).




The image shows the top navigation bar of the "timbre information system". It contains the text "Timbre > search aim" on the left, a central banner with text about funding from the European Community's Seventh Framework Programme (2011-2014) under grant agreement no. 265364, and a user-related link "admin - Logout" on the right, which is circled in red.

Figure 19. User related link to be clicked to change the password and user-related information.

Clicking on the user-related link reported in Figure 19 (i.e., the “admin” link), the user profile will be displayed as reported in Figure 20.



Timbre > search aim admin - Logout

 **timbre information system**
the timbre project: <http://www.timbre-project.eu/>

This research project has received funding from the European Community's Seventh Framework Programme (2011-2014) under grant agreement no. 265364

User Profile

Email:

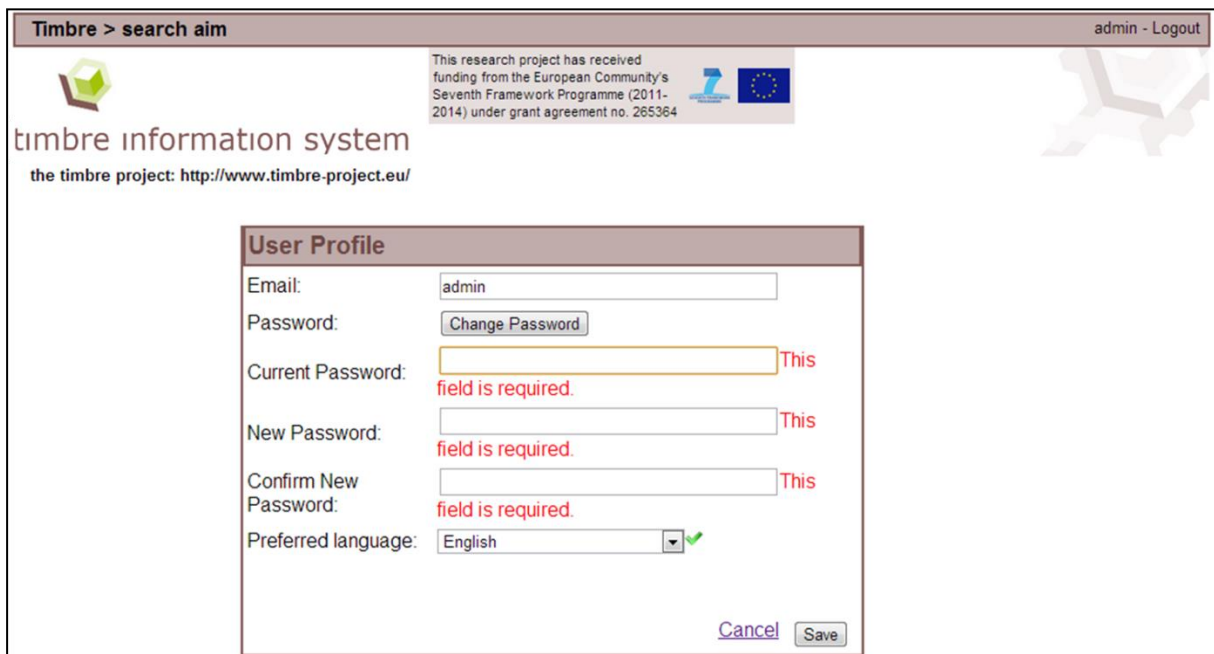
Password:

Preferred language: ▼


[Cancel](#)

Figure 20. User profile.

Clicking on the “Change Password” button reported in Figure 20, the window for the password change will be displayed as reported in Figure 21.



Timbre > search aim admin - Logout

 **timbre information system**
the timbre project: <http://www.timbre-project.eu/>

This research project has received funding from the European Community's Seventh Framework Programme (2011-2014) under grant agreement no. 265364

User Profile

Email:

Password:

Current Password: This field is required.

New Password: This field is required.

Confirm New Password: This field is required.

Preferred language: ▼ ✓

[Cancel](#)

Figure 21. Change password window.

A8 Expert users

Users can delete or modify only the information they have uploaded in the system, while the administrator can delete or modify any information collected in the system. However, in the perspective of developing an Information System which will be a “living” system relying on the active participation of an international network of experts and stakeholders, the intention is to reduce as much as possible the need for intervention by the system administrator. To this end a different typology of users has been created, called “Expert users” category. Expert users have system rights to modify and delete not updated information and web links. There are two stages where a user becomes aware that he/she can become an expert user:

1. In the “Email Validation” page, where he/she can visualise the question: “Would you like to become an Expert User?” (Fig. 22):

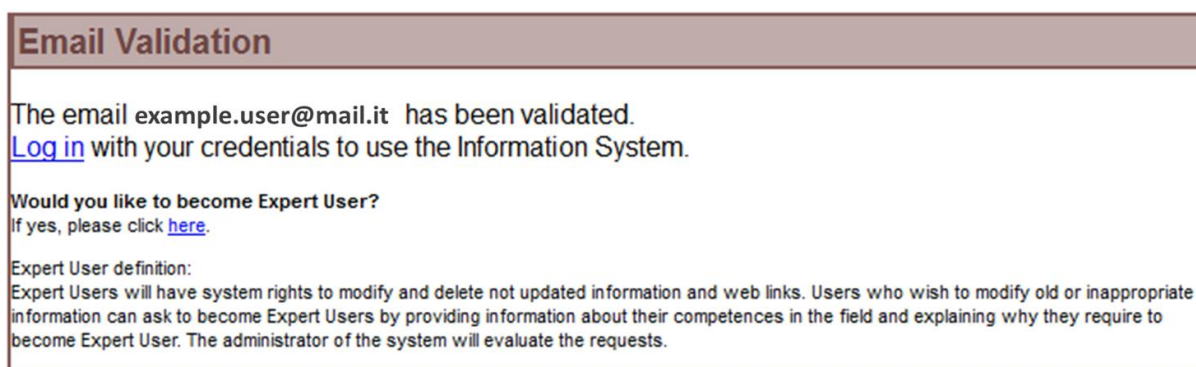


Figure 22. “Email Validation” page.

2. When he/she tries to modify or delete a web link. Indeed, if the user clicks on the pencil or on the red cross a pop-up is immediately displayed (Fig. 23).

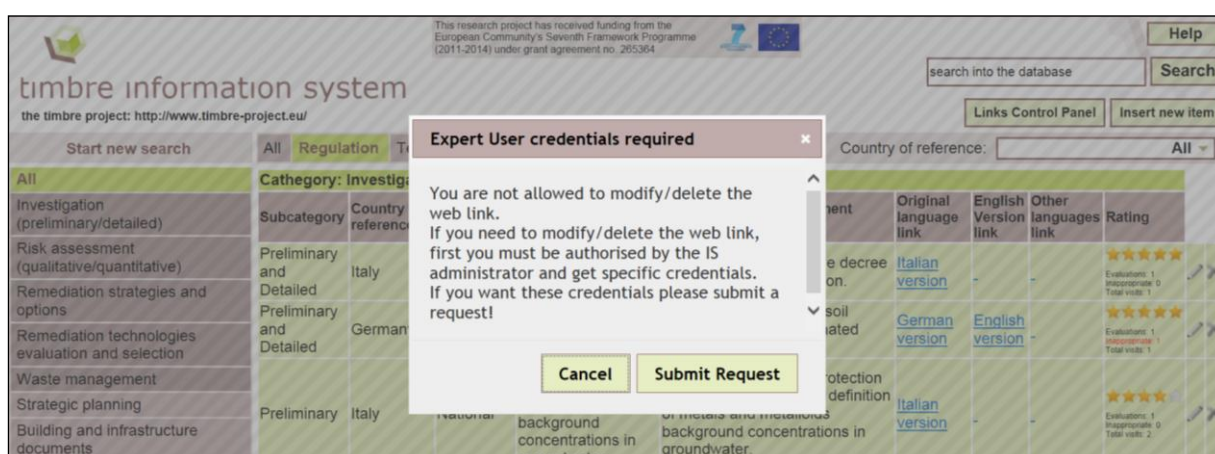


Figure 23. Pop-up notifying that Expert User credentials are required to modify or delete information collected in the system.

Clicking on the button “Submit Request” of the pop up, the user is redirected to the page where he/she can ask to the Information System administrator to become an expert user after providing information about his/her competences in the field of brownfield regeneration and explaining why he/she requires to become an expert user, as showed in Fig. 24.

The list of the required mandatory data includes:

- 1) Name and Surname:
- 2) Organisation you work for:
- 3) Position in the organisation you work for:
- 4) Field of activity:
- 5) Years of experience:
- 6) Reasons why you want to become a TIMBRE Information System expert user:



The figure shows a web form titled "Expert User Request". It contains six input fields corresponding to the requirements listed in the text: "Name and Surname:", "Organisation you work for:", "Position in the organisation you work for:", "Field of activity:", "Years of experience:", and "Reasons why you want to become a TIMBRE Information System Expert User:". The first five fields are standard text boxes, while the last one is a larger text area with vertical scrollbars. At the bottom right of the form, there are two buttons: a "Cancel" button with a red underline and a "Submit" button with a grey background.

Figure 24. Window where the user can apply to become an expert user.

After filling in all the required information, the user can click on a button “Submit” to complete the procedure.

Then an e-mail with the user’s request will automatically be sent to the Information System Administrator mail box. The Administrator will evaluate the user’s request and send a feedback to user by e-mail.

A9 Help

If users need information about how to consult the Information System and how to upload new data, they can click on the button „Help” in the top corner of the screen (Figure 25). By clicking on this button, the present „User Manual” will be downloaded as a pdf file.

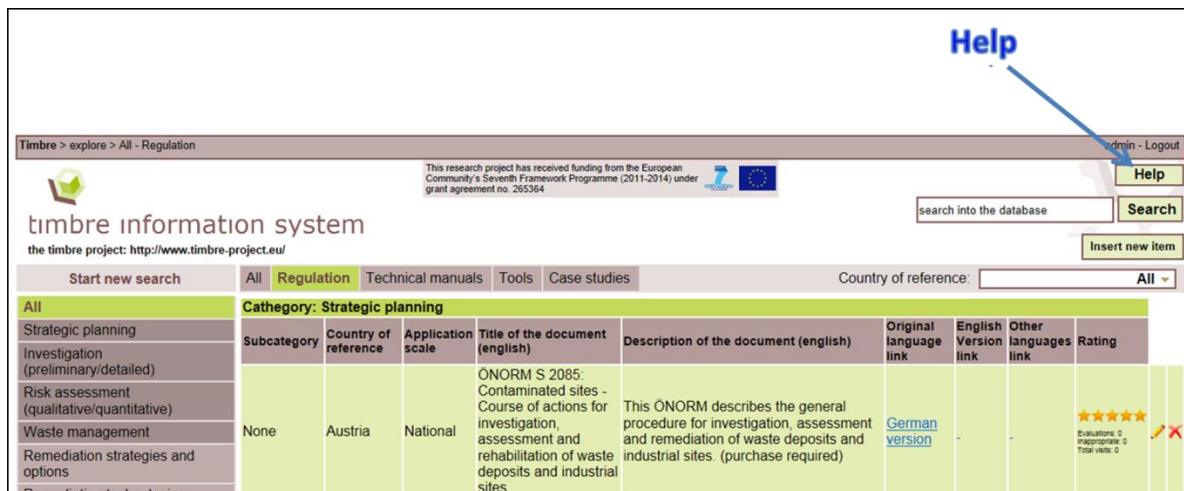


Figure 25. “Help” button.

A10 Log out

For security reasons, when the user decides to leave the Information System, he has to click on the “Logout” button on the top right corner of the screen (on the brown bar) (Figure 26).

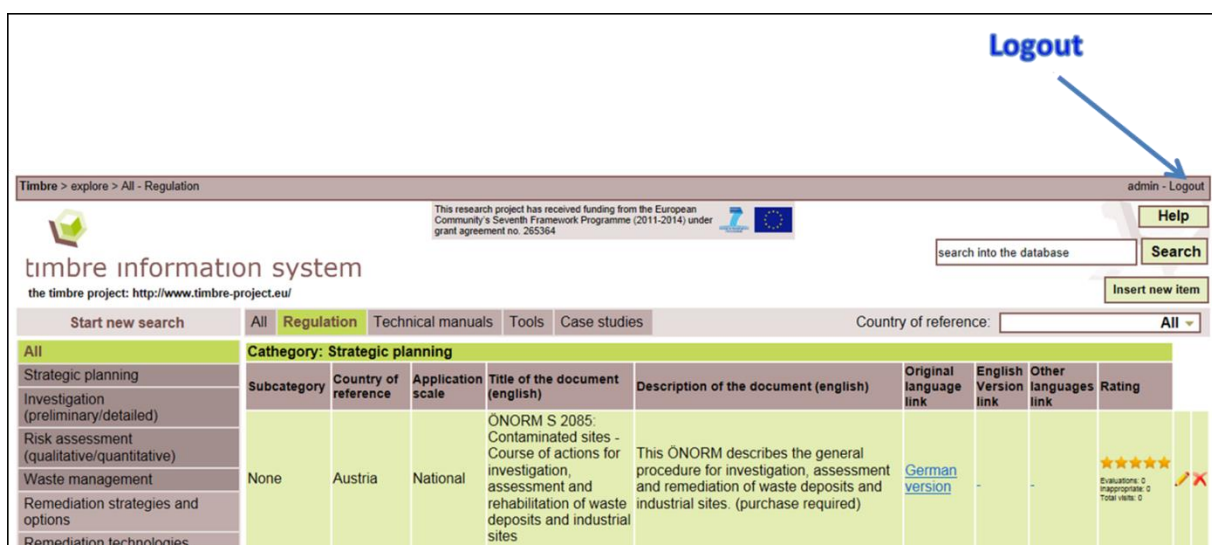


Figure 26. “Logout” button.

Disclaimer

This document is aimed at assisting brownfield regeneration stakeholders. It is provided for information purposes only and its contents are not intended to replace consultation of any applicable legal sources or the necessary advice of a legal expert, where appropriate.

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Annex II: Contributors to the report and Disclaimer

Contributors

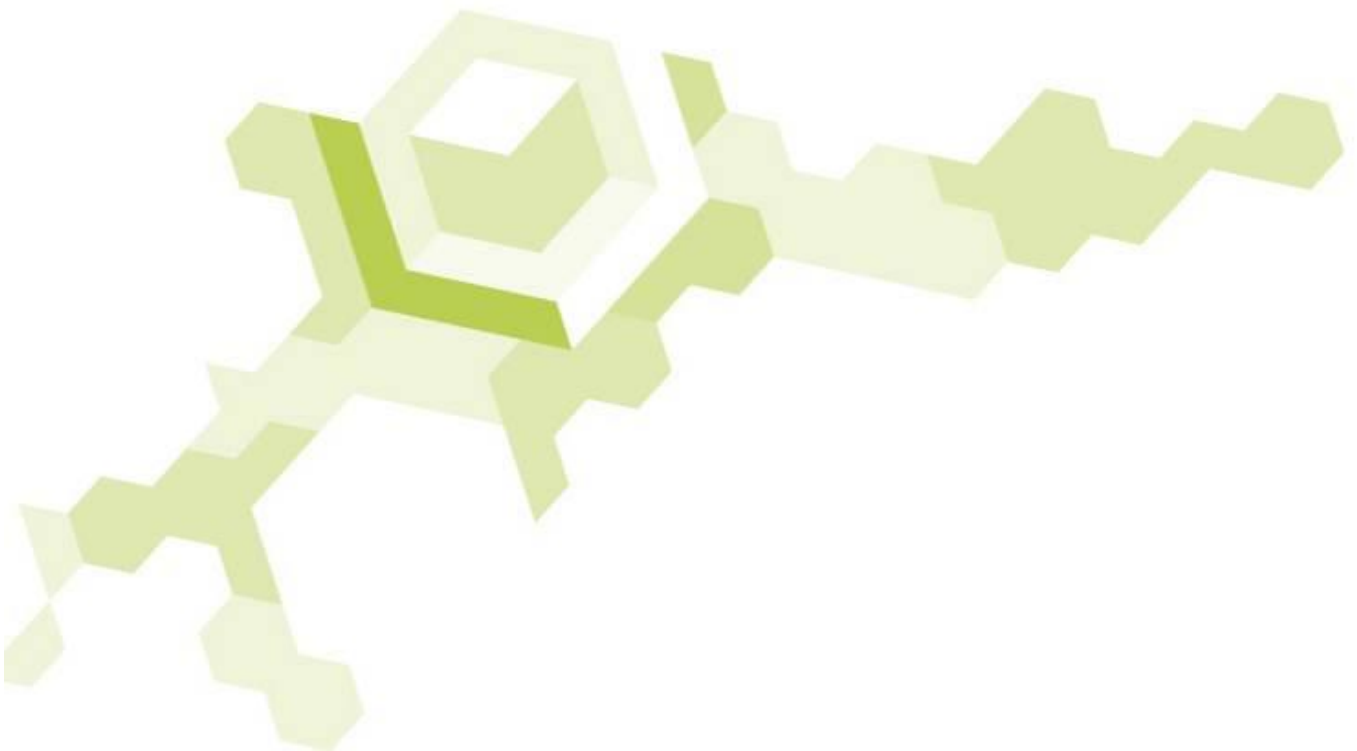
This report is the result of discussions between all partners of the Timbre Work Package 1. It has been authored by Lisa Pizzol, Erika Rizzo, Elisa Giubilato, Alex Zabeo, Luca Cosmo, Andrea Critto, Antonio Marcomini (UNIVE) and edited by Stephan Bartke (UFZ).

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