Internet based tool for assessing regional location factors

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1   ABSTRACT

The internet based assessment tool presented in this paper is being developed within the framework of the EU-financed research project ‚AsPIRE’, which investigates the importance of so-called ‘soft’ location factors like social capital or regional governance for rural economic development. After conducting case studies in selected regions followed by a statistical analysis of development patterns across Europe, the assessment tool is designed to present scientific results for a particular region, to enable regional actors to give their own assessments and thus to facilitate policy decision-making.

2   THE AsPIRE PROJECT

The objectives of the project 'Aspatial Peripherality, Innovation and the Rural Economy' (AsPIRE) of the 5th RTD Framework of the European Union are (i) to establish the concept of 'aspatial peripherality', (ii) to provide a methodology for measuring/mapping it through regional indicators and (iii) to generate best-practice and policy evaluation guidelines. 'Aspatial peripherality' is a term devised by the project team to describe a range of processes which are increasingly emerging to compound or distort the handicaps conventionally associated with remote locations. AsPIRE is a co-operation of seven partners from Finland, Germany, Greece, Ireland, Scotland and Spain under the leadership of the Rural Policy Group of the Scottish Agricultural College in Aberdeen. The assessment tool is being developed by IRPUD and Spiekermann & Wegener as the German partners.

3   REQUIREMENTS AND CONCEPT

The AsP-assessment tool is being designed as a user-friendly set of tools and procedures to allow regional agencies to assess the components of AsP (Aspatial Peripherality) in their region and to suggest appropriate forms of intervention. There are numerous options for setting up such a tool ranging from solely quantitative analysis to completely qualitative assessment entirely based on user input. The Dortmund AsPIRE team decided to link these two scenarios and create a tool that encompasses user input as well as ‘hard’ statistical data from the AsPIRE database. The application to be developed should be accessible by everyone interested or involved in rural development policy-making. This encompasses regional politicians as well as decision makers in regional planning agencies. Thus it seemed to be reasonable to develop the tool as a server based application, accessible via the internet. The spatial range of regions to be assessed covers all rural regions of the present EU member states.

Because of the wide range of potential users the tool’s usage has to be simple and intuitive. To collect the necessary information and to maintain the user’s interest the tool has to interact with user input and has to generate ‘intelligent’ results to gain the user’s trust. The presentation of the tool's questions should encourage the user to complete the whole assessment and to avoid early abortion by the user. The presentation of the results should be distinctive and valuable for all users. These results should form a regional profile in regard to the ASP-Themes combining user inputs and results queried from the AsPIRE database. Finally to avoid any frustration using the tool the user should know his exact 'position' or progress within the overall assessment process.

4   IMPLEMENTATION

Since the tool should be developed as an internet based application an appropriate software environment had to be utilised providing the developer with all the features potentially needed. This concerns server operating system, webserver and database software as well as certain components needed which are provided by the scripting language utilised. Each and every part of the assessment process will make use of these features to provide the user with the appropriate functions.

4.1   Software environment

Three criteria guided the choice of an appropriate software environment. First it should be state of the art, secondly it should meet all requirements concerning the features needed and finally it should be open source in order not to consume too much of the project’s funds.

The popular ‘LAMP’ combination has been chosen as the basic software environment. ‘LAMP’ stands for ‘LINUX, APACHE, MySQL, PHP’ and represents a combination of software very popular in use for the implementation of webservers. Taken together these programmes allow user interaction and dynamic content generation with database integration. The operating system LINUX offers a stable, secure and cheap solution for the implementation of public webservers. The APACHE webserver is a widespread, very capable piece of software and available for many different operating systems. Netcraft finds that the present market share of webservers using APACHE software products amounts to about 66 % (over all current domains) (cp. Netcraft, http://news.netcraft.com/archives/2003/12/02/december_2003_web_server_survey.html).

To provide the tool with the data needed for the assessment process MySQL is used since it is a very popular open source database software which offers very good integration with the server scripting language PHP. The scripting language is needed to implement the actual application. It offers the ability to enhance webpages with program code which is processed by the server when a site is requested. The results are then sent back to the client, usually in form of HTML-documents. This allows the processing of user inputs and dynamic content generation. PHP offers almost all functionality needed for building the AsP Assessment application.

4.2 Selected components used

Following the requirements identified there were several components which seemed useful and thus had to be provided by the scripting language employed. As mentioned above PHP meets all these requirements like built-in session management and the ability to generate dynamic graphics to name just a few.

4.2.1 Session management

From the beginning of the development it was clear that the application would have to collect information from the user. In order to grant full functionality to all users it was decided to avoid the use of cookies. To still be able to have all the necessary information present during the entire assessment session it became obvious that a server sided solution to store this information was needed. It was then decided to use the built-in session management which is part of the PHP distribution since version 4. This means that a session is assigned to every user at the start of the assessment process. This session is identified by an unique session id. During the assessment process all information and user inputs are stored server sided referring to this session id. This enables the tool to keep track of all user inputs and actions and finally enables the development of a process-like application. When the user finishes or cancels his assessment the session and all related data are erased.

4.2.2 Dynamic graphics generation

In order to be able to present assessment results along with statistical data in an adequate way it was decided to use charts for visualisation. But since these charts had to make use of user ratings and the tool should cover all rural regions within the present EU member states it seemed inevitable to implement a solution which is able to generate the graphics needed on the fly. The "GD" library which ships as an extension included in the recent PHP-distribution is the suitable solution for this task. It offers many useful image creation and manipulation functions as well as text integration. The most popular file formats currently supported by "GD" are JPEG and PNG. The latter one was chosen for use with the assessment tool because it offers fair compression rates without any loss of quality comparable to the popular GIF format which is not supported by "GD" anymore due to licensing related issues. The output produced by the assessment tool are image files which visualise user assessment results as well as statistical data queried from the database in the form of appropriate charts. These are part of the assessment result pages.

4.3 The online assessment process

Since the application has to collect different types of information from user input before presenting any results the whole application is designed as a process to be passed through. Each step either provides the user with important information or acquires information needed from the user. Only after all necessary user input has been given the tool is able to present the assessment results. This is why the user guidance became an important issue in order to have a fully functional application which motivates the user to complete the whole process. The most important steps are the selection of the basic user interface language, the selection of the country and region the user wants to assess, the completion of the region related user input forms and finally the assessment result pages.

4.3.1 General user guidance

The very first stage of the assessment process is the selection of the user interface language. This screen will be displayed no matter which document has been requested by the user because this is the basic information to be given right from the start of the assessment process. In general the user will not be able to request advanced stages of the assessment process until having completed preceding ones. After an appropriate language has been selected the 'Welcome'-screen will be displayed saluting the user in the language chosen and giving general information on the background of the assessment tool and the assessment process. When the user proceeds to the next step he needs to choose a predefined user type giving general information about his institutional background. This is currently only used for internal statistical purposes but it is well imaginable that the result pages could incorporate this information e.g. for more actor-specific recommendations. The fourth step is the selection of the country respectively the region the user wants to assess. After giving this basic input the actual assessment procedure begins. The application presents forms for the 5 different AsPIRE themes ICT, business networks, social capital, governance and tourism plus some basic input concerning economy and accessibility. After having completed the user assessment section the result screens will be displayed illustrating the user assessment and assessments derived from the AsPIRE statistical database in the form of charts plus short explanations. The final result screen containing the overall results for the region combines all user and AsPIRE assessments to a 'regional profile' and gives a short text on strengths and weaknesses of the region regarding AsP. Furthermore some links to advanced information and/or best practice examples for compensating weaknesses and/or taking more advantages of the region's strength are offered to the user. This is the final stage of the assessment tool.
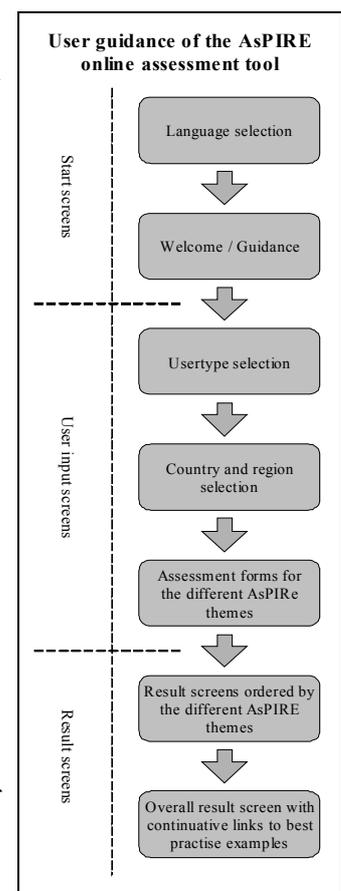

Abb. 1: User guidance (scheme)

4.3.2 Language modules / Dynamic user interface

When requesting the assessment tool's URL via an internet browser the language selection screen will be displayed. The language selection is done by a simple drop-down menu box with 'English' as the language preselected by default. The available languages displayed are results of a database query, where all available languages are registered. All textual elements presented on the screen are taken from the appropriate language module which is processed at the time of document generation through PHP according to the language chosen before. The text files used for the different languages can be translated into other languages with reasonable efforts.

Abb. 2: User interface (displaying an assessment form)

The tool's user interface has been designed to guide the user through the assessment process. Therefore it always presents the assessment progress status in the left 'menu' bar. This is dynamically generated and lists all steps to be performed by the user, marks the current step in bold letters and the steps already performed in a slightly faded colour. In order to force the user to go through the process step by step only the steps already completed are linked to the corresponding web pages. Thus the application enables the user to go back if he wishes to check or modify previous inputs. At the top of the user interface the current date is always displayed formatted according to the language chosen. The bottom of the screen contains three links ('Imprint', 'Terms of use', 'Contact') which are not directly related to the actual assessment. Finally the main part of the screen displays the current page content providing the user with a clear screen layout.

4.3.3 Country and region selection

Since the assessment has a spatial reference the user must be able to choose which region he wants to do his assessment for. As stated before the tool is designed to assess regions classified as rural by the AsPIRE project since rurality related issues are the project's main focus. For a more comfortable region selection the user at first has to choose the country the region belongs to. Therefore a drop-down box is used containing all available countries queried from the database. After the country selection a second drop-down box is displayed containing all regions belonging to the country chosen before. Alternatively the user can choose country and region via a map displayed in a pop-up window when requested.

4.3.4 Assessment forms

The actual user assessment for the region chosen before is done through the already mentioned assessment forms. Each of these forms contains five questions related to one of the five different AsPIRE themes. In order to make the user concentrate on each question separately the subsequent questions are not displayed. Since all previous questions remain visible all five questions along with the assessments made are displayed at the final question of each theme before continuing to the next theme. A status line at the bottom of the form keeps track of the present assessment status giving the user information on the amount of questions left in order to avoid frustration with seemingly endless question sessions. Each question asks the user to assess his region with respect to the issue in question using a scale of five values ranging between the two extreme feature characteristics.

4.3.5   Results display

After completing all assessment forms the assessment result screens are displayed. These are also ordered by the AsPIRE themes. Following the statements made in the concept section each result screen contains three main sections, the user's assessment, the AsPIRE assessment for that theme and a text box that summarises the main results of the AsPIRE project for the particular theme. The first two sections visualise the assessment results using the chart generation module mentioned above and give an overall rating of the particular AsPIRE theme in the form of a short sentence. In addition the user gets supplementary information on the relevance of each issue by a pop-up window when requested. The final overall result screen summarises all results of the previous screens in a generalised manner. Furthermore the user will be provided with links to further information e.g. best practice examples. Finally a print function at the end of the result screens offers the user the ability to request a printer-friendly version of the assessment results for local print-out.

5   OUTLOOK

Since the tool should be up and running at the end of the project there is still some work left to do concerning its implementation. In addition it is envisaged to develop an internet mapping solution for the country and region selection via an interactive map as well as for cartographic results presentation. For these functions it is considered to use the free UNM mapserver which seems to offer a very good integration with the GIS data formats and the PHP scripting language used by the project. After testing and final bug-fixing the application will be released for public use. Since it is currently only running on a development platform and not put on a machine accessible by the public the final URL is not specified yet. But it will of course be linked from the AsPIRE website (http://www.sac.ac.uk/management/External/Projects/AspireExternal/AspireDefault.htm).

6   REFERENCES

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