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Oldřich Faldík  
*Mendel University in Brno*, oldrich.faldik@mendelu.cz

Jiří Hřebíček  
*Mendel University in Brno*, jiri.hrebicek@mendelu.cz

Oldřich Trenz  
*Mendel University in Brno*, oldrich.trenz@mendelu.cz

Edward Kasem  
*Mendel University in Brno*, edward.kassem@mendelu.cz

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Web Portal for Corporate Sustainability Evaluation, Modelling and Benchmarking

Oldřich Faldík, Jiří Hřebíček, Oldřich Trenz, Edward Kasem
Faculty of Business and Economics, Mendel University in Brno
Zemedelska 1665/1, 613 00 Brno, Czech Republic
{oldrich.faldik, jiri.hrebicek,oldrich.trenz,edward.kassem}@mendelu.cz

Abstract: The ability of a company to maintain productivity over time and thus retain the potential of profitability and stability to the long-term is termed sustainability. The appropriate combination of sustainability indicators from a number of different fields, such as economic, social, environmental and corporate governance, is maintained during this period. In conjunction with the support of corporate reporting, it is a powerful tool that companies use to endorse internal environmental and financial reporting, distribution of descriptive information about the company into its surroundings, and a way to follow Key Performance Indicators. The aim of this paper is to present the prototype of the web portal WEWEBRIS (Web Information System for Corporate Performance Evaluation and Environmental Reporting). This portal can be adapted to various segments of the market by adding further modules. A module for a selected segment consists of several sub-modules that are focused on data collection and retrieval. The portal is oriented to support corporate sustainability and reporting in the selected subject area and was used in a pilot study performed in small and medium-sized breweries and biogas stations in the Czech Republic. It supports sustainability modelling in small and medium-sized enterprises. WEWEBRIS uses the support of XBRL as the native format for financial and sustainability reporting. The WEBRIS portal module for benchmarking allows sustainability assessment of a company from the given segment and supports its sustainability. It is a clear, simple and practical application with respect to sustainability modelling.

Keywords: Web portal; Enterprise; Sustainability; Modelling; Key Performance Indicators; Corporate performance evaluation; Benchmarking

1 INTRODUCTION

Currently, there are many systems dealing with corporate sustainability reporting, for example the Global Reporting Initiative (G4 Guidelines, 2013). One of its main systems is the G4 Content Index Tool (G4 Content Index Tool, 2016), which is used as a Microsoft Excel template. This tool allows us to evaluate companies from different perspectives, i.e. from the perspective of indicators that fall into the following three groups: Economic, Environmental and Social.

Another tool is the GRI G4 REPORT (Enablon Publisher, 2016), which offers a cloud-based solution to reporting. Report outputs are then supplemented with graphical visualizations. This tool also provides a fully responsive Web interface. The Sustainability Assessment of Food and Agriculture (SAFA) system tool (SAFA Tool, 2016) providing an easy access through a Web interface is also noteworthy. Corporate sustainability performance under the situation of the current economic theory and practices is most often measured using the Economic Value Added (EVA) indicators (Skapura, 1996; Sharma, Kumar, 2010, Qi, 2011). The EVA indicator from the perspective of financial management combines all the basic components.

Another indicator, the Sustainable Value Added (SVA) indicator (Figge, Hanh, 2004, 2012, 2013) is an efficient approach to the assessment of sustainability. It plays a strategic role in decision making. It stimulates companies to manage resources more efficiently and effectively. The Sustainable Value Added is the extra value created by using economic, environmental and social resources, compared against a benchmark. It expresses in absolute monetary terms (Hodinka et al., 2012, Hřebíček et al., 2013, Kocmanová et al., 2013).

According to Vadi (2014) Czech breweries play an important role in the economic and social areas, creating one of the most important economic values and largely participate in the country employment rate. Our research is focused on corporate sustainability modelling and benchmarking.
In a previous research (Hodinka et al., 2012, Hřebíček et al., 2013, Kocmanová et al., 2013) we assembled a model which integrates environmental, social, economic and corporate governance indicators. It aggregates multiple indicators from various frameworks and allows enterprises to compare their performance effectively. A pilot version of this model was verified in the biogas segment and the brewery segment in the Czech Republic (Hřebíček et al., 2015; Kasem et al., 2015).

At the present time, the model is being verified as to its applicability under practical conditions. Subsequently, the synthesis was performed. Furthermore, a web application was designed in accordance with the requirements. Finally, the application was implemented and tested. The aim of this paper is to introduce the use of information and communication technologies (ICT) for the support of sustainability evaluation, modelling and benchmarking for small and medium-sized enterprises - the newly developed prototype of the portal WEBRIS (Web Information System for Corporate Performance Evaluation and Environmental Reporting). We discuss the design and implementation of the portal WEBRIS, which is based on cloud technologies, aimed at promoting sustainable development of companies and benchmarking.

2 WEBRIS - WEB INFORMATION SYSTEM FOR CORPORATE PERFORMANCE EVALUATION AND ENVIRONMENTAL REPORTING

2.1 Design of the WEBRIS system

The WEBRIS system should allow the authentication and authorization. There are two types of WEBRIS users. The first type of a user is the company and WEBRIS allows login or registration of the user – a new company. After registration, the user is offered either to complete a new identification form or is shown the original identification downloaded from linked open data from the business register of entrepreneurs of the Czech Republic (Business register, 2016). The second type of a user is the web administrator. Its user rights are extended with browsing the forms of any company.

2.1.1. Software architecture of WEBRIS

The portal WEBRIS includes the modules which have a clearly defined contract, i.e. a list of provided and required services. Besides that, this modular architecture is combined with Model-View-Controller (MVC) architecture (MVC Framework Tutorial, 2016). The reason for interconnecting it with MVC architecture is that within a module which contains business logic, the necessary overhead logic can occur. This is intended to render the output from an application as a Web site. Therefore, logic of the module is divided into three layers (Business layer, Control layer and Presentation layer).

Figure 1 of WEBRIS architecture shows that each segment of WEBRIS has its own module (violet colour). In each of these modules, there is a template with a definition required by the questionnaire, designed in order to detect specific information needed for KPI calculation.

Given that the monitored KPI may be shared across all segments, another module, which is shared by all modules, and collector modules play a role in collecting data necessary for KPI calculation. This module can also communicate with another module in order to obtain information from linked open data of public sources of the Czech Republic (Business register, 2016).

The module for obtaining information from other sources is used to pre-fill or supplement the questionnaire form which will be filled in by the company in this segment. Thus they will save time. This module performs the connection to the linked open data of the Czech eGovernment website (Business register, 2016) from which it draws maximum information required by the questionnaire form. Unfortunately, due to the fact that linked open data websites do not have a defined Application Programming Interface (API), this module must parse the website at the level of DOM (Document Object Model). Subsequently, the required document with the necessary information is downloaded, and, moreover, this document is subjected to optical character recognition (OCR), i.e. optical character reader (Tesseract-ocr, 2016).

The whole procedure of data acquisition can take several minutes because data cannot be acquired while filling in the questionnaire. However, it is necessary to obtain data in advance. The resulting information is passed via a certain method of the module interface.
The last module of the WEBRIS system is designed for benchmarking. This module allows the comparison of selected KPI of the company within a certain sector. In the Presentation layer, it displays graphically the values of particular KPI within a given industry. In addition to the graphic format, it also allows export to other formats, such as XBRL (XBRL, 2016).

The data storage carried out by a group of database systems contains the NoSQL database for storing data associated with intermediate calculation needed for KPI. A relational database system is used in order to store information about companies, questionnaires and KPI. The systems are complemented by XBRL Dictionary and XML Resource.

2.2. Implementation of application

Regarding the requirements for availability, the system WEBRIS was implemented as a web application. PHP7 (PHP: Hypertext Preprocessor) was selected as the language for the application implementation. MVC framework Nette (Nette, 2016), which allows us to divide the application into particular modules and thereby ensure the sustainability of future development, was used as an extension of this language.

2.2.1. Business layer

The framework also allows using the Access Control List (ACL) model, which has already been implemented in it. This ACL model allows defining the roles and their subsequent assignment to particular users. Due to the requirement of authentication and authorization, the user roles (Administrator, Company) are treated with this model.

Since the application is focused on collecting questionnaires, it is necessary to use a database where these will be saved. Given the complexity of the calculations, MySQL (MySQL, 2016) is the best choice.

Furthermore, in the module of WEBRIS for extracting data from public resources, PHP function `preg_match()` is used for orientation in a downloaded pdf document. For the OCR processing itself, the tool Tesseract (Tesseract-ocr, 2016) is used, the result of which is the text output.
Tesseract is the most accurate OCR, which is freely available. It does not have a graphical interface, and therefore, it is necessary to execute it in the command line or via another program. In combination with Leptonica Image Processing Library (Leptonica, 2016) it can read a wide variety of image formats and convert them into text form in over 60 languages.

2.2.2. Presentation layer

The frontend Bootstrap framework (Bootstrap, 2016) was used in order to ensure responsiveness of the web design. This technology allows optimization of websites for mobile devices. On the basis of the submitted form, a diagram is shown which presents the company's performance in comparison with individual average values in each sector that have an impact on the calculation of SVA, see Figure 2 and Figure 3. In the report heading, there are buttons for export of the reporting to the PDF format Add report, suitable for printing and to XBRL format Add report suitable for data exchange with other applications.

<table>
<thead>
<tr>
<th>Company</th>
<th>Reg. No.</th>
<th>Segment</th>
<th>Year</th>
</tr>
</thead>
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<td>Brevy</td>
<td>2009</td>
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<tr>
<td>Anonymised company</td>
<td>13685487</td>
<td>Brevy</td>
<td>2010</td>
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<tr>
<td>Anonymised company</td>
<td>13685487</td>
<td>Brevy</td>
<td>2011</td>
</tr>
</tbody>
</table>

Figure 2. Final report

3.2.3. WEBRIS Deployment

The prototype of WEBRIS portal is deployed in the two following environments: development environment and production environment. Within the production environment, the WEBRIS portal is deployed in the infrastructure of Mendel University. In the development environment, WEBRIS portal is deployed in the IBM Bluemix cloud platform (IBM Bluemix, 2016). This technology allows scaling of virtual runtime environment according to immediate needs.
3. DISCUSSION AND CONCLUSIONS

The Value Added for users (registered companies) in our WEBRIS portal is that our portal brings the corporate sustainability evaluation and benchmark of the given company against values from similar companies in the given sector. Corporate sustainability modelling and a benchmark itself can be motivating for companies because it compares a particular company with other companies in the given sector. Benchmarks are conducted against anonymised companies; therefore no company can detect the exact indicator values from other companies in the given sector. Comparing WEBRIS portal with the G4 Content Index Tool, users of WEBRIS do not need to purchase any other software. WEBRIS portal is a cross-platform system which is also mobile operable. Even though the GRI G4 REPORT tool is also a cross-platform system, it is not open source and completely free in comparison with our solution. Due to the modular architecture of the WEBRIS portal, anyone can download the source code and easily add another module. However, the addition of another module requires programming knowledge.

Other sustainability reporting web information systems were implemented (Hodinka et al., 2012; Hřebíček, Vernerová, Trenz, 2013; Kocmanová et al., 2013, Popelka et al., 2013) in the past four years. The prototype of the WEBRIS portal was made to ensure that the chosen sustainability indicators can be computed and implemented successfully and verify its usability by the end users. We concentrated on assessing and modelling sustainability of agricultural farms with crop production systems under the conditions of the Czech Republic and developed an ICT tool that differs from the newly developed SAFA software (SAFA Tool, 2016).

In contrast, our application is, beside others, focused also on a mobile access. It contains the security ALC model.

Figure 3. Final report (detail)
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