



VIRTUAL ENGINEERING ECO - INNOVATION LIBRARY FOR THE MANAGEMENT ISSUES OF THE WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT

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Abstract: Research conducted in this paper are part of a national project, with the topic: *Virtual eco-innovation hub to increase competitiveness in the field of waste electrical and electronic equipment recycling” (EcoInnEWaste)*. The project aims to respond to a challenge with profound economic, social and environmental implications: the increase of firms organizational competitiveness, that are operating in the field of electrical and electronic equipment recycling (e-waste, WEEE) in Romania and the increase of R & D private and public entities involvement in eco-innovation promoting for the green economy. One of the innovative tools that will be created for the traders in the e-waste recycling area, that will be a component of the hub, is the virtual engineering eco – innovation library. The execution of this documentation component of EcoInnEWaste platform allows the users access to relevant information resources for recycling domain.

Keywords: eco - innovation, library, WEEE, management

1. INTRODUCTION

Research conducted in this paper are part of a more ample national project, with the topic: *Virtual eco-innovation hub to increase competitiveness in the field of waste electrical and electronic equipment recycling” (EcoInnEWaste)*. The project aims to respond to a challenge with profound economic, social and environmental implications: the increase of firms organizational competitiveness, that are operating in the field of electrical and electronic equipment recycling (e-waste, WEEE) in Romania and the increase of R & D private and public entities involvement in eco-innovation promoting for the green economy, [1].

One of the innovative tools that will be created for the traders in the e-waste recycling area, that will be a component of the hub, is the virtual engineering eco – innovation library.

The execution of this documentation component of EcoInnEWaste platform allows the users access to relevant information resources for recycling domain, [2], [3].

It enables users to consult a library of eco - innovation and the implementation model of eco – innovative technologies, which are useful for business representatives and companies that are involved or they wish to become involved in WEEE problem. The access of the hub information will be restricted, being paid or free, function the information category and the databases restrictions, but a lot of questions will find answers for free – by using the library or the Hub Forum. In terms of hub information management, they can be edited / added / deleted only by the platform operators.

2. THE VIRTUAL ENGINEERING ECO – INNOVATION LIBRARY FUNCTIONALITIES

To establish virtual engineering eco – innovation library functionalities it was necessary to analyze and clarify:

- The networking opportunities between library components;
- The demand – supply connection;
- The legislative information collection;
- The eco – innovation news;

- The participation in the eco-innovation events;
- Gathering of practical information regarding the collection, the waste transport, the landfills of waste, their treatment and / or recycling.

For the library achieving it is aimed to obtain quickly practical or theoretical information for the user.

Specifying library components, interfaces design and implementation of design specifications are designed to build an accessible virtual engineering eco - innovation library, easy to use, that will provide up-to-date and useful information.

The library conception shows its utility by its components (Figure 1), which offers information about:

- Environmental legislation;
- Actors involved in e-Waste management;
- Studies, research, basic knowledge of the WEEE guidelines;
- Eco - innovative technologies;
- News from eco-innovation domain, etc.

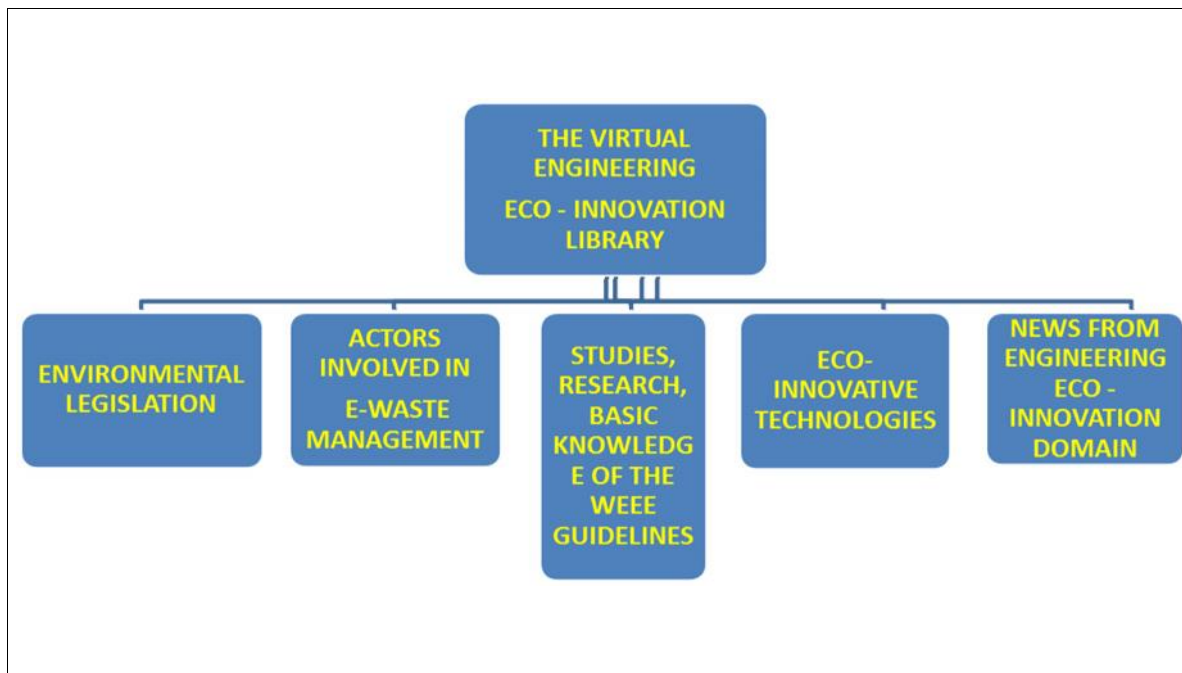


Figure 1: The structure of the virtual engineering eco – innovation library

The conception and the functionalities of the virtual engineering eco – innovation library have the quality of being suited to serve the purpose to inform the business environment in WEEE domain, [4].

There is also presented the range of operations that can be run on a computer to follow the necessary steps in order to obtain the required information.

The functional structure of the virtual engineering eco – innovation library and the information delivery required by the user must involve:

- The ability to manage the information (add, delete, change) by administrators and their selection criteria;
- The possibility of search terms customization by the user;
- The possibility of on WEEE legislation for the users;
- The possibility of documenting specialized users on businesses involved with the WEEE;
- The possibility of a specialized documentation on the WEEE studies, research, guides for the users;
- The possibility of a specialized documentation concerning the eco -innovative technologies for the users;
- The possibility of specialized documentation concerning the eco – innovation news for users;
- The possibility to save obtained information, after the documentation stage.

3. THE VIRTUAL ENGINEERING ECO – INNOVATION LIBRARY DEVELOPMENT

The development of the virtual engineering eco – innovation library involves the development of 5 modules, which functions were presented before. By accessing each one of these modules, the users can obtain information (paid or free, function the hub restrictions), which can be saved.

So, the access of the library leads to the option of obtaining information from modules regarding: *Environmental legislation, Actors involved in e-Waste management, Studies, research, basic knowledge of the WEEE guidelines, Eco - innovative technologies, News from eco-innovation domain*. Once it was selected the domain name to be accessed, the user can proceed to the next step.

If the user selects the module providing information on *Environmental Legislation*, he must follow the next step, by selecting one of the three sub-modules regarding the legislation: *National Legislation, European Union Legislation* or *Other countries Legislation*, (Figure 2). By searching a key word, in Romanian or English, it can be obtain the required information, as a text file, a link or a pdf file, with the possibility to save it.

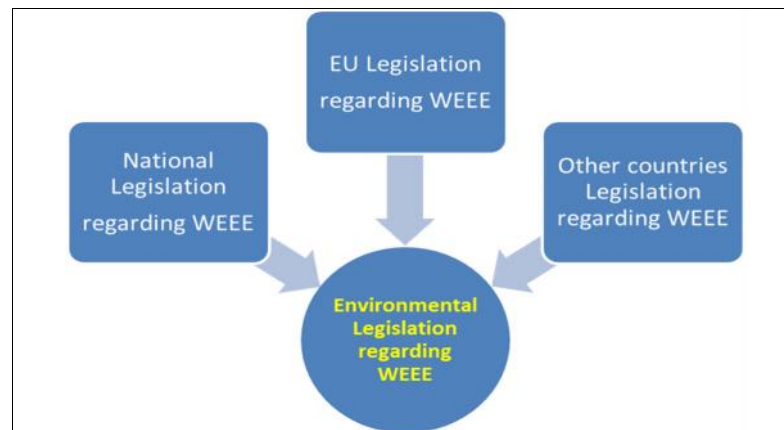


Figure 2: The module on the Environmental Legislation regarding WEEE

If the user selects the module providing information on *Actors involved in e-Waste management* (Figure 3), he can choose to obtain information about the business environment involved in WEEE, about NGOs and other organizations involved in WEEE or about Authorities. Each sub - module offers the possibility to search the information by a key word and to obtain a text file, a link or a pdf file, also with the possibility to save it.

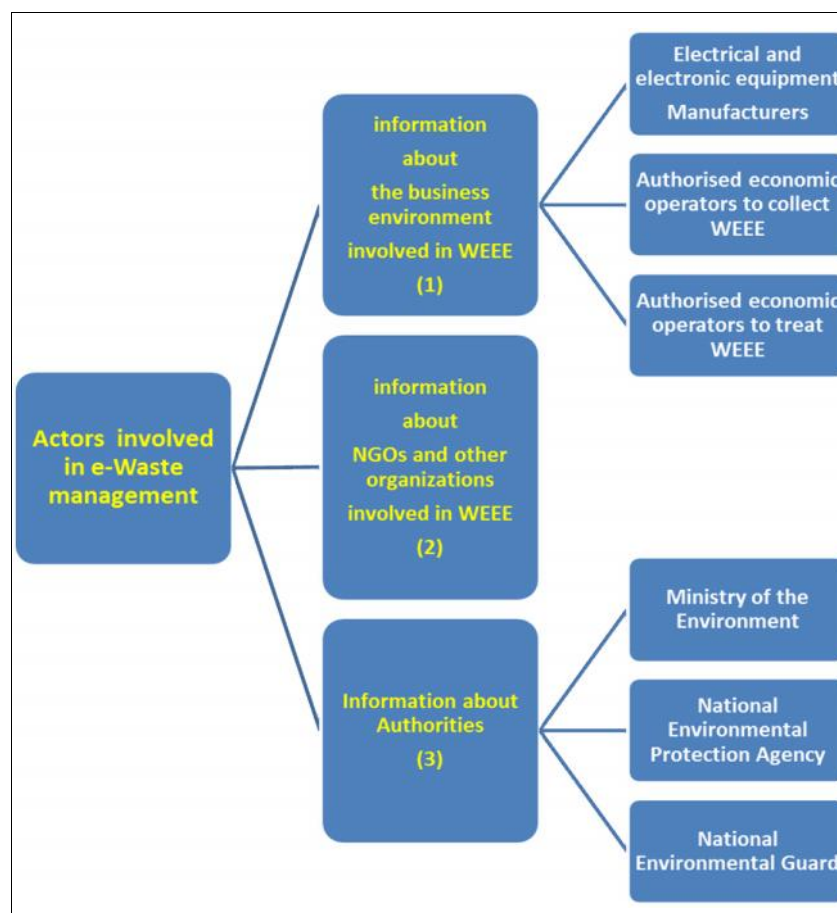


Figure 3: The module concerning the Actors involved in e-Waste management

The *Studies, research, basic knowledge of the WEEE guidelines* module offers information about Doctoral thesis and Dissertations concerning WEEE (1), Books – in this field of interest (2), Guides and specialized studies on WEEE (3) and about Papers published in Specialized Journals, in Conference volumes in the field of WEEE (4), (Figure 4).
 Required information can be access in Romanian or English, by selecting the language and also, information can be saved.

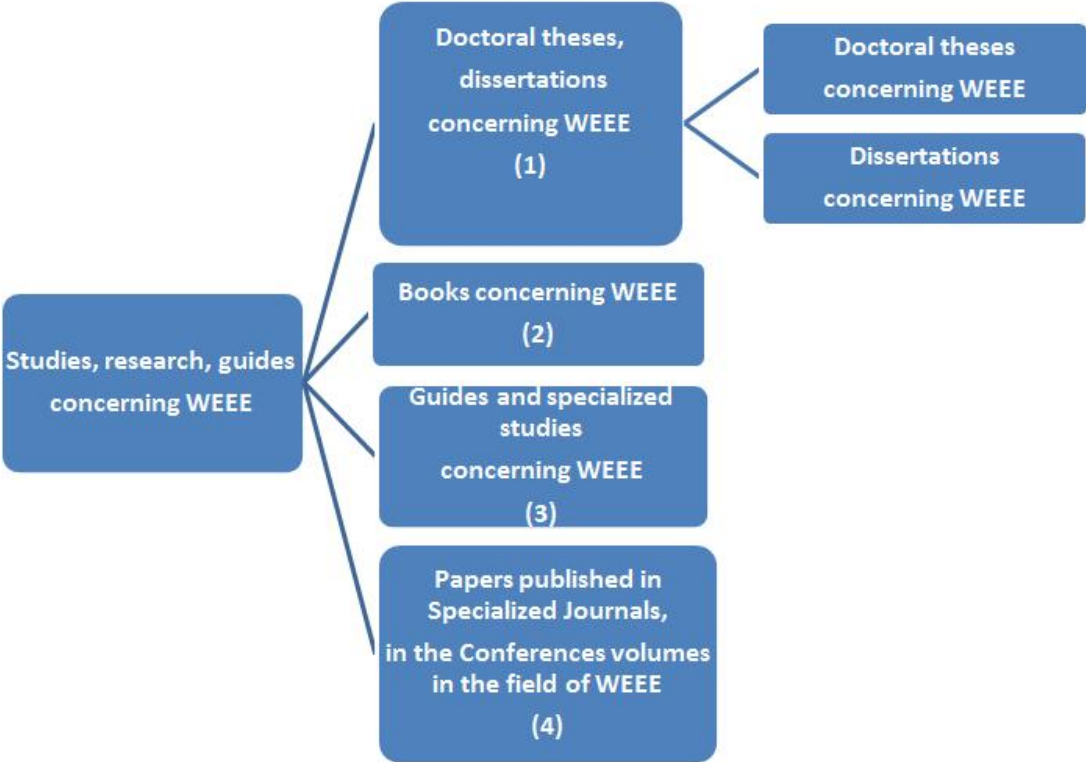


Figure 4: The module concerning the Studies, research, basic knowledge of the WEEE guidelines

If the user selects the module about *Eco – innovation technologies* to obtain information, it is possible to access the *Implementation model of eco – innovative technologies*, a way to eco – innovation for the company. In this case the user downloads a file or a computing program, which can be saved.
 If the user wishes to consult the Library with *Examples of existing successful eco - innovative technologies*, he must select this sub – module. He will obtain a text file, a PDF file or a link to desired information, which can be saved, (Figure 5), [5], [6].

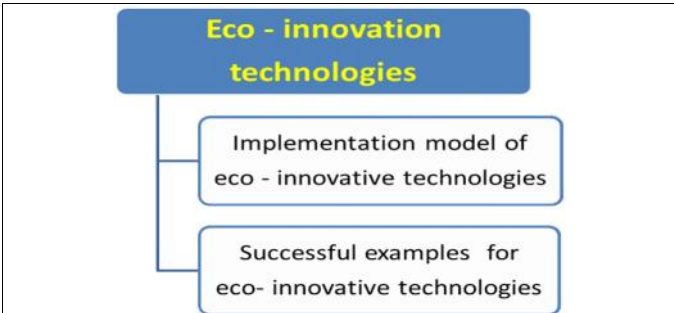


Figure 5: The module concerning the Eco- innovation technologies

If it is selected the module regarding *News from eco-innovation domain*, it is possible for the user to select: *Information about WEEE from websites, Information about trade fairs, exhibitions, research fairs concerning WEEE, Information about conferences, seminars, workshops on WEEE*, (Figure 6), [7], [8]. For each case, it may be select the search for a keyword or group of keywords, in Romanian or English, yielding a text page, a PDF file or a link to the desired information. Finally , there is the possibility of saving the required information.

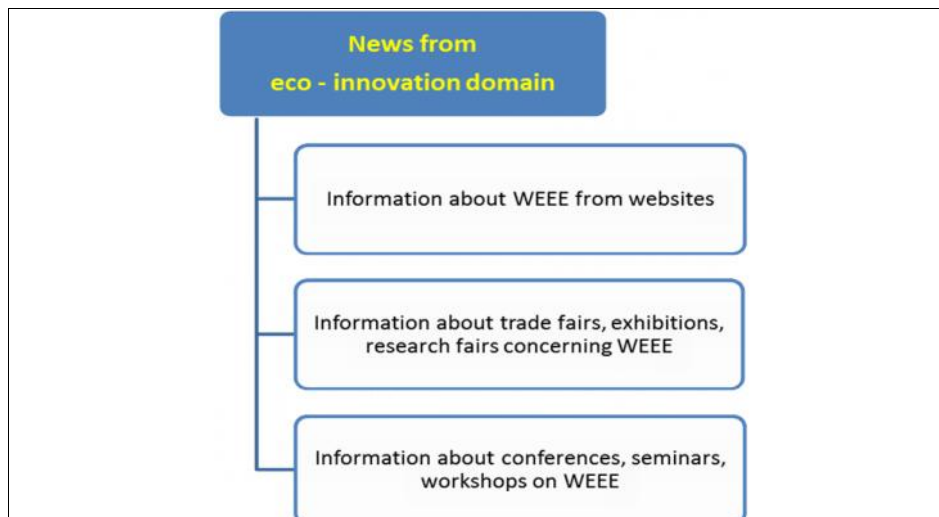


Figure 6: The module concerning the News from Eco- innovation domain

4. CONCLUSION

Developing new instrument as the virtual eco-innovation hub is a way to increase competitiveness in the field of waste electrical and electronic equipment recycling. The target of the society is to obtain, in the following years, firms benefit from a real economic development, based on technological research for reducing raw materials and energy consumption, expertise and consultancy on eco – efficient materials use, green products and services, informing systems for development of environment infrastructure. Increasing awareness level of economic actors will help as a direct contribution to sustainable economic development.

Virtual engineering eco - innovation library for the management issues of the waste of electrical and electronic equipment is a way to the stimulation to innovation and technology transfer, to consider economic and social value of environment resources. It is important to influence the business environment for a rational use and development of initiatives for decreasing economic activities' impact on environment through research-development solutions, ITC, technological transfer and automation.

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- [7] <http://www.waste-management-world.com/articles>
[8] <http://ec.europa.eu/environment/waste/weee>