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IMPLEMENTATION OF ENVIRONMENTAL TECHNOLOGY VERIFICATION THROUGH INNOVATIVE TRAINING IN RESPONSE TO URGENT ENVIRONMENTAL CHALLENGES

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Abstract

The world is being confronted with urgent environmental challenges such as climate change, the unsustainable use of resources and loss of biodiversity. Innovative technologies can make a significant difference in terms of resource and cost saving, but they often fail to reach the market because they cannot demonstrate a successful track record of previous applications. In this context, it has appeared the Environmental Technology Verification (ETV) with the main aim of helping innovative environmental technologies to reach the market faster and easier. ETV is an initiative that provides for third-party verification of the performance claims made by technology manufacturers in business-to-business relations. By issuing a Statement of Verification, which is the product of a successful ETV process, ETV provides credible information on the new technology to could reach the market reducing risks.

Since its creation in 2011, ETV has been implemented in few European Countries (only 7 countries are Members States: Belgium, Czech Republic, Denmark, Finland, Poland, France and United Kingdom) and due to this geographical limitation, a group of different European organisations (SME, university, associations, technological centres, clusters, etc.) have created ETV4INNOVATION Consortium, with support from the Erasmus Plus Programme of 2017 (Project Reference: 2017-1-IE001-KA202-025703) whose main aim is to create a flexible learning pathway in line with the needs of learners and companies in terms of ETV.

Following the competences identified by a key study on general needs by SMEs towards ETV, companies can respond to these environmental issues. In order to provide students with the key competences related to environmental planning, we have created a Joint Curriculum composed by 3 main learning outcomes:

- Basic aspects of verification of environmental technology
- The ETV programme as a commercial tool on domestic and international markets
- Practical aspects of the ETV verification

Keywords: Environmental Technology Verification, ETV, environmental challenges, environmental technologies, market, Erasmus Plus, Learning outcomes, Joint Curriculum.

1 INTRODUCTION

The world faces a range of environmental challenges that will impact on its future prosperity. These include resource depletion, increasing water scarcity, air pollution, climate change and biodiversity loss. Concretely Europe leads on innovation in innovative environmental technologies which can provide solutions while also increasing EU competitiveness. However, breaking into the market with innovations can be a significant problem, because innovations by definition cannot show a successful track-record. Without credible information about innovative technologies, potential buyers are unsure whether or not to trust the claims made about their performance.[1]

Thus, European Commission with 7 Member States (France, Belgium, Finland, Czech Republic, Denmark, Poland and United Kingdom) intends to launch a solution to address that problem in 2011: Environmental Technology Verification (ETV). This initiative provides a third-party verification of the performance claims made by technology manufacturers in business-to-business relations. By issuing a Statement of Verification, which is the product of a successful ETV process, ETV provides credible information on new technology. Market access for these innovative technologies is significantly enhanced and the technological risk for technology purchasers (whether private or public) is reduced. The information contained in the Statement of Verification summarises the actual performance of the verified technology as well as the results of the tests performed. With proof of performance credibly assured, along with information about the design of the tests, innovations can expect a larger market share.[2],[3]

Nowadays, the most common reasons why SMEs don't apply for ETV verification are that they unknown details about this initiative, they assume which it is too complicated and that it is necessary a lot of paperwork to could obtain the verification. In this context, a group of different organisations (SME, university, associations, technological centre and cluster) have created ETV4INNOVATION Consortium. This eco-innovative partnership of 6 European Countries (Ireland, Spain, France, Bulgaria, Poland and Denmark) encompasses in ETV4INNOVATION project (*Development of an online resource to train enterprises with the final objective to foster them into Environmental Technology Verification*) has the objective of creating a flexible learning pathway in line with the needs of learners and companies in terms of ETV. This e-learning course will fill gaps in relation with ETV for current and future managers and workers in technological sectors.[4]

2 METHODOLOGY

The aim of ETV4INNOVATION project is to design and develop a Joint Curriculum for filling gaps related to ETV for current and future managers and workers in technological sectors. The project methodology followed was focused on the achievement of the following specific objectives:

SO1. Identify the lack of knowledge in the organizations to be able to manage and bet on ETV which incorporate green requirements in the development of new eco-technologies.

SO2. Design and develop a Joint Curriculum (JCV) on ETV with the participation of stakeholders from the industry, experts in the topic of green technology such as Verification Bodies, Clusters and Universities with expertise in this eco-innovative verification (ETV).

SO3. Deliver the JCV on e-learning OER Platform and protect it under open licenses.

SO4. Break borderlines among SMEs and large companies and experts in ETV, creating common procedures and skills.

SO5. Equipping enterprises with the right skills and knowledge for the ETV verification of today and tomorrow and fostering a sustainable technology process. It will be performed by promoting better anticipation of ETV skills needs and developing better matching between skills and companies needs and European green requirements too.

SO6. Awareness of current environmental problems, the need to carry out a sustainable development and bring more respectful practices with the environment.

In order to reach all the objectives defined in the project, ETV4INNOVATION has comprised the following activities:

- Comparative analysis and evidence-gathering, studies examples of good practices and real-life cases of successful ETV verification already performed, etc. in order to identify the skills needs and competences in the technological sectors required to successfully applied for ETV process: the main

objective of this activity was to provide a complete analysis of the current skills and needs to improve the technological sectors towards ETV with high level of competences to boost the competitiveness of the eco-technology sector and the green innovative requirements.

- Development of a Joint Curriculum with the integration of different learning modes and innovative approaches: the main objective of this activity was to define, describe and grouping in units or modules the learning outcomes of the ETV4INNOVATION training course.

- The creation of learning and training materials together with methods, pedagogical approaches and tools: the main objective of this activity was to develop the training methodology content of the ETV4INNOVATION course.

- The implementation of a training and collaborative e-learning platform to ensure that all the materials developed is certainly deployed by creating an open online course: the main objective of this activity was to develop an e-learning platform in order to deploy all the training material developed in the previous activity by creating a Massive Open Online Course (MOOC).

3 RESULTS

After the implementation of the four activities defined in the methodology of the project, the general results expected were:

- From the key study activity, a report developed describing the current situation of the SMEs and the skills needs towards technological sectors prepared to foster ETV. This report has been used as a starting point to define the learning outcomes as well as to define the training material content which was developed in further activities.

- From the Joint Curriculum definition, a key document with the description of the training modules and units compiled in the ETV4INNOVATION course, as well as the final tool for knowledge verification.

- From the training material activity, the main results were the definitive version of all training materials necessary for the course of the project. All were previously harmonized to achieve a coherent structure of the content along the suggested curriculum.

- From the e-learning platform, the main result was the MOOC platform which contains the ETV4INNOVATION course (the training materials regarding ETV and their application in technological sectors such as waste, resources, etc.).

3.1 Key study activity and definition of ETV4INNOVATION Joint Curriculum

The overall aim of the Erasmus+ ETV4INNOVATION project is to design and develop a Joint Curriculum for filling gaps in relation with ETV for current and future managers and workers in technological sector as materials, waste & resources technologies, water technologies and energy technologies. ETV4INNOVATION is a two-and-a-half-year long EC funded VET Strategic Partnership project under Erasmus+ programme. It has been designed with the aim to support the development and the implementation of an innovative practice and a new training path in the field of ETV. The project is created to support the development and the implementation of an innovative practice and a new training path in ETV. ETV4INNOVATION Consortium has an objective to achieve one of the goals of the Europe 2020 strategy for smart, sustainable and inclusive economy. For this reason, a balance between technological innovation and efficiency in production process, as well as improvement of products have been promoted.

One of activities carried out was a Key Study on General Needs by SMEs towards ETV. In order to perform it, the "Cedefop's European skills and jobs (ESJ)" survey of 2014 in all EU Member States was analyzed. It revealed that about 30% of European employees possess qualifications that are not well-matched to those required by their jobs, while about 45% of EU adult workers believe that their skills can be better developed or utilized at work. According to the conclusions obtained by Cedefop in this study, ETV4INNOVATION project considered the relevancy of looking deeper into a complete analysis of the current skills and needs to improve the technological sectors towards ETV, with high level of competences, to boost the competitiveness of the eco-technology sectors and the green innovative requirements for today and tomorrow. The study was elaborated through a two-stage methodology, consisting of a desk research and a survey followed by an endorsement on the key finding by relevant stakeholders.

The desk research was carried out to identify the future and current needs related to eco-technology and ETV, as well as the main needs and requirements to face these challenges by Europe technology industry and other stakeholders.

As a result of this desk research the ability, capacity, skills and competences need set towards ETV and SMEs were established and detected. The endorsement of the researched needs was undertaken through a planned survey conducted with 90 participants from SMEs and related stakeholders, including regional administrations, universities, development agencies, research and innovation entities, VETs, etc.

According to the conclusions obtained from the desk research and the endorsement survey, it has been defined and analyzed the most suitable curriculum having as a basis both the skills and competences required for achieving green and innovative technologies and the key elements in which ETV are based:

- Basic aspects of verification of environmental technology
- The ETV programme as a commercial tool on domestic and international markets
- Practical aspects of the ETV verification

3.2 ETV4INNOVATION Training Material

One of the main results of the ETV4INNOVATION project is the creation of the training materials that will provide users the opportunity to expand your knowledge on how to apply for ETV and the added value of achieving this verification from technical and commercial perspectives. In each lesson, ETV4INNOVATION partnership has prepared different interactive materials:

- Presentations to summarise and facilitate the knowledge acquisition
- Interactive tools for some main training materials (infographics, videos, etc.)
- A coursebook with all the information included in the modules
- Additional readings in order to deep in particular training topics
- Quizzes to assimilate the acquired knowledge

The course is divided in 3 modules, each once composed by different lessons:

Module 1. Basics aspects of Verification of Environmental Technology

In this module, the student will have a first approach to the necessary concepts of ETV. This Module is divided in six lessons:

1. Overview of ETV
2. ETV in the world
3. Main objectives of ETV
4. Targeted Technologies
5. Verification process
6. Main features of ETV/Summary

Module 2. The ETV programme as a commercial tool on domestic and international markets

In this module, the student will have a complete view of the ETV programme as a tool for boosting the commercialisation of a product, process or service in domestic and international markets. This Module has five lessons:

1. ETV objectives in terms of commercial exploitation
2. Technology Readiness Level
3. The integration of marketing plan for ETV sellers
4. Which are the benefits of clients regarding ETV?
5. Success case of ETV

Module 3. Environmental Technology Procedure

In this module, student will have a complete training on the practical aspects of an ETV verification which some success cases. This Module has four lessons:

1. Case Study
2. ETV eligibility
3. Step-by-step ETV verification
4. Quality Data

3.3 ETV4INNOVATION Training and Collaborative Platform

Consortium has developed an e-learning platform in order to deploy all the training materials prepared during the project by creating a massive open online course (MOOC).



Figure 1. ETV4INNOVATION e-learning platform.

Fig. 1 shows the global architecture of ETV4INNOVATION platform, based on Opigno, the specific e-learning module of the Content Management System (CMS). This module was selected because it is open source and makes possible to create interactive contents.[5]

This e-learning platform could work as a template for future training content and will allow uploading and designing web VET curriculum regarding others technology fields. In addition, it is compatible and fully working on smartphones and table systems.

4 CONCLUSIONS

Within the European Commission's European Green Deal, one of the measures they seek to adopt to become the first climate-neutral continent is to get manufacturers to provide reliable, comparable and verifiable information about their products so that buyers can make more sustainable decisions and reduce the risk of "green washing".

To this end, tools such as ETV are essential to provide a protocol for testing and verifying the performance of innovative environmental technologies. In this context, ETV4INNOVATION training course has designed and developed a Joint Curriculum for filling gaps related to ETV for current and future managers and workers in technological sectors.

This course is free and is available at ETV4INNOVATION e-learning platform. In general, project has strengthened the education and training path of target users and stakeholders.

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