



Co-funded by the
Tempus Programme
of the European Union

University of Maribor
Faculty of Electrical Engineering
and Computer Science

Enhancement of cyber educational system of Montenegro

EXP. Project Sustainability

SUSTAINABLE STRATEGY v3.0

Authors:

Dragan Đurić, IMTM

Ivan Petrović, IMTM

Ramo Šendelj, UDG

Ivana Ognjanović, UDG



Co-funded by the
Tempus Programme
of the European Union

Faculty of Electrical Engineering
and Computer Science

Enhancement of cyber educational system of Montenegro

1. Introduction

Living in modern time, 21st Century, means that people lives have gone digital: in the world of cyberspace. Everybody use the Internet, computers, cell phones and mobile devices every day to communicate with family, friends and colleagues. People do business online every day, from banking to shopping to accessing government services – and do it from wherever they happen to be. Digital infrastructure makes all this possible, and also keeps essential services up and running. The society is embracing the many advantages that cyberspace offers, and how it has positive impact on economy and better quality of life. But the increasing reliance on cyber technologies makes people more vulnerable to those who attack the digital infrastructure to undermine the national security, economic prosperity, and way of life. Criminals are exploiting the speed, convenience and anonymity of the Internet to commit a diverse range of criminal activities that know no borders, either physical or virtual, cause serious harm and pose very real threats to victims worldwide.

All reports and analyses done in Montenegro from the period of ECESM project preparation to now days indicate that level of public awareness of cyber security is very low. And, this must be changed. Against ever evolving cyber-threats the need to graduate students skilled in the concepts and technologies of cyber-security is becoming a critical responsibility of academic institutions in order to help preserve the companies' business systems and country sovereignty. Also, the importance of non-academic education should not be ignored. All citizens, not only ICT professionals, need to continually keep their skills related to cyber security sharp and up to date.

Sustainability of all project results should be ensured after project duration, including both, academia and workforce. The leader of formal education will be master study program in cyber security at University Donja Gorica and University of Mediterranean, and the leader of informal educational activities at national level will be centralised at Montenegrin Cyber security Education Centre – MCEC. MCEC will be a hub of cooperation and innovation of all interested parts in Montenegro, enabling them modern education in cyber security together with eminent educational institutions at international and global levels, sharing their knowledge and experience.

The enhancement of overall cyber security posture of the Montenegro, by accelerating the availability of educational and training resources designed to improve cyber skills of every segment of the population, is the main objective of ECESM project. But, as Montenegro wants to continue with society and economic development, this objective must become one of the national priorities.

The ECESM Sustainable Strategy v3.0 is aimed on providing the basis for sustainable national, academic and non-academic, educational system, with highlights on strategic goals and corresponding implementation plan. This strategy is focused on the period after project realization, i.e. this strategy plan represents long term sustainability plan of education in cyber security.

The mission can be define in one sentence, on the following way: creation and development of modern educational environment to extend and enhance the knowledge and skills about cyber security among various stakeholders in Montenegro and to increase awareness of community.

This Strategy contains two main, working sections. Next to the Introduction, The Section 2 describes and analyses of achieved results defined in Sustainability strategy v2, and Section 3 contains new goals that have be achieved after project duration. Sections 4 provides information about implementation tools of defined goals in Section 3.

2. Sustainability Strategy v2: Analysis of achieved results

Strategy goals defined in the Sustainability Strategy v2 and its implementation plan are summarized in the Table 1. In the text below the Table1, it is given the indicators and their status of realization.

Table 1. ECESM Sustainability Strategy v2.0: Goals and Implementation plan

GOALS	IMPLEMENTATION PLAN
1. Raise awareness about the necessity of continual education in cyber security field and promote new cyber security educational programs (including both, formal and informal)	1a. Intensify promotional activities among different target groups at national level 1b. Organise National Cyber Security Forum as well promoted national cyber security event (with well known speakers; representatives from governmental, local and educational sectors; etc.) 1c. Implement specific promotional activities of newly established Master programs in Cyber Security (at University Donja Gorica and Mediterranean University) 1d. Implement specific promotional activities of programs led by newly established Montenegrin Cyber Educational Center (linked to actions 4x, 5x)
2. Continually organize annual conference about cyber security at national level	2a. Continue with organisation of the annual conference "Cyber security in the knowledge society: threats, risks and achievements" 2b. Intensify activities of extending audience at regional and international level
3. Continually publish online journal to support research in the field of cyber security	3a. Continue with publishing online journal "Cyber instructions for all" 3b. Use different channels to distribute the online journal and invite international authors to contribute acting as journal authors/editors



Co-funded by the
Tempus Programme
of the European Union

Faculty of Electrical Engineering
and Computer Science

<p>4. Promote and strengthen activities of the newly established Montenegrin Cyber Educational Center by positioning it as a leader of national cyber society in Montenegro</p>	<p>4a. Intensify promotion of the newly established Montenegrin Cyber Educational Center among different target groups at national level</p> <p>4b. Develop new programs at open learning platform (with different level of specialisation, from general courses to highly specialized in different aspects of cyber security)</p>
<p>5. Ensure sustainability of the Montenegrin Cyber Educational Center (operational; financial; social)</p>	<p>5a. Ensure FINANCIAL sustainability of the Montenegrin Cyber Educational Center (through new funding schemes and sources)</p> <p>5b. Ensure OPERATIONAL sustainability of the Montenegrin Cyber Educational Center (through established cooperation with relevant ministries, key stakeholders at national level, etc.)</p> <p>5c. Ensure SOCIAL sustainability of the Montenegrin Cyber Educational Center (through organisation of new actions and recognisable position at national level – linked with actions 4x)</p>
<p>6. Ensure multiplicity of all ECESM training activities at national level</p>	<p>6a. Intensify promotions of ECESM training activities at national level and invite more participants (linked with 1a)</p> <p>6b. Intensify activities on inviting interested parties (from different sectors) to organise more similar trainings for their employees or other interested groups</p>

Goal 1. Raise awareness about the necessity of continual education in cyber security field and promote new cyber security educational programs (including both, formal and informal)

Implementation Indicators.

1a. Brochures about ECESM project and project results disseminate to different audience.

1b. First Cyber Security Forum has been organized on 20th October 2016 at Innovative entrepreneurial centre Tehnopolis, in Niksic. More than 80 participants attended the event. The US ambassador opened the Forum.

1c. The website for Master program in Cyber Security at University Donja Gorica has created. The brochures about Master program have been distributed at promotional events.



Co-funded by the
Tempus Programme
of the European Union

1d. Brochures with information about new established MCEC has created and distributed at promotional events. MCEC work presented at companies in almost all municipalities in Montenegro.

Status. Completed. Continue with Forum organisation and promotion activities after project realization.

Goal 2. Continually **organize annual conference about cyber security** at national level

Implementation Indicators.

2a. Organised 3rd ECESM Conference as a part of Regional well-known Festival of Information Technology Achievements- INFOFEST

2b. ECESM project mentioned at national and international conferences through participation of ECESM partner representatives.

Status. Completed.

Goal 3. Continually **publish online journal** to support research in the field of cyber security

Implementation Indicators.

3a. 6 issues of the Newsletter are already published, until now.

3b. Information and link of published newspapers shared on project website and official ECESM Facebook page. Some of partners shared the link to newspaper on their private profiles at social networks.

Status. Completed.

Goal 4. **Promote and strengthen activities of the newly established Montenegrin Cyber Educational Center** by positioning it as a leader of national cyber society in Montenegro

Implementation Indicators.

4a. MCEC promoted among companies at almost all municipalities in Montenegro. At trainings in Chamber of Economy, the MCEC has been presented.

4b. New learning materials has been published at Moodle platform.

Status. Completed. Update Moodle platform with new materials.

Goal 5. Ensure **sustainability of the Montenegrin Cyber Educational Center** (operational; financial; social)

Implementation Indicators.



Co-funded by the
Tempus Programme
of the European Union

5a. IMTM have different roles at new IPA Europe/Aid/136938/ID/ACT/ME projects – as coordinator at one, and as partner at the other project, and MCEC will be the hub of training and workshop organization related to security issues in both, medical information systems and cloud based solutions.

5b. Since September 2016 MCEC office is in Innovative entrepreneurial centre 'Tehnopolis'. Innovative entrepreneurship centre TEHNOPOLIS is the first part of the capital project of the Government of Montenegro (Ministry of Science) – creation of Science and Technology Park Montenegro. The good cooperation with Chamber of Economy and Ministry of education will contribute to better positioning of MCEC at national level.

IMTM (MCEC is established as part of this partner institution) signed Memorandum of understanding and cooperation with GCSEC.

5c. MCEC promoted at School portal (07/05/2016), University of Economics in Bratislava (05/05/2016) and Faculty of business and tourism Budva (25/05/2016). The link to MCEC Moodle platform is uploaded at FBT Distance Learning Platform and EUBA Moodle Platform.

Status. Completed.

Goal 6. Ensure multiplicity of all ECESM training activities at national level

Implementation Indicators.

6a. Because of low response at trainings in CEM from companies from North and South region of the country, the 3day trainings were organized in Bijelo Polje (for companies from North) and in Budva (for companies from South).

6b. At Forum and the other promotional events Moodle platform (with highlight on training curricula) was presented to audience.

Status. Completed.

3. Sustainability Strategy v3: Goals

The main goals of sustainability strategy – version 3.0 are:

1. Internationalization of Cyber security education

A multidisciplinary master program in cyber security is already established and new generation of students is enrolled, thus allowing further steps in its internationalization and making it closer to well known study programs at EU and global level: enabling students and staff exchanges, ECTS transfers, joint courses and programs, etc.

2. Providing specialized support to business sector in challenging cyber security fields

MCEC will intend to bring together the highest level of organizational and technical resources for the purposes of consultancy and specialized services, education, training, qualification and professional development of work force



Co-funded by the
Tempus Programme
of the European Union

University of Maribor
Faculty of Electrical Engineering
and Computer Science

Enhancement of cyber educational system of Montenegro

3. **Continue with developing Cyber security literacy at national level**
MCEC, together with Universities, Government bodies and the other stakeholders will promote importance of cyber security to the audience
4. **Lifelong education in cyber security**
Cyber security area, as ICT generally, is highly dynamic sector with many innovations and very short life cycles, so it is very important to follow new trends in cyber security and transfer new knowledge to the society. The Moodle MCEC Distance Learning Platform shall be used as a mean to attract general public to access posted learning materials at Moodle.
5. **Cooperation** with HEIs, relevant national and international government and private institutions

4. Sustainability Strategy v3: Implementation Plan

In order to achieve defined goals, the following actions/activities are proposed:

- 1a. Promote existing Master study programme in cyber security at University Donja Gorica at regional and international level
- 1b. Establish sustainable connections with well-known universities at international and EU level; receive EU funds for internationalization of the program, providing financial support to staff and students' exchange, ECTS transfers, accreditation of joint programs, etc.
- 2a. Provide consulting services for companies in different fields of cyber security actions, policies, standards and education
- 3a. Organising events, preparing and distributing materials and brochures with topics about general cyber security issues and its distribution to citizens
- 3b. Continue with organisation of Cyber Security Forum in Montenegro, as a key national event in the field
- 4a. Accreditation of lifelong programs in Cyber security
- 4b. Enable open access to posted learning materials for boarder public and citizens
- 4c. Promote Moodle MCEC Distance Learning Platform among business sector and other national bodies
- 5a. Strengthen the cooperation between MCEC and HEIs in Montenegro to provide constant exchange of knowledge and expertise in the field of cyber security
- 5b. Strengthen the cooperation with relevant institution and association in cyber security at global level
- 5c. Strengthen the cooperation between MCEC and relevant government bodies to follow current cyber security situation and together react on cyber treats