Novel Strategies to Fight Child Sexual Exploitation and Human Trafficking Crimes and Protect their Victims

H2020 – 101021801

www.heroes-fct.eu

D10.19 Exploitation Plan

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Abstract (for dissemination)
This deliverable presents the project results and actions that are potentially exploitable, as well as the partners capacity to exploit the results.

Keywords	Exploitation plan, market analysis, Business model

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1.0	30/11/2022	Luis Javier García Villalba (UCM)	Final Version

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Executive summary

This deliverable deals with the exploitation strategy throughout the development and lifetime of the HEROES project. The objective of this deliverable is to identify the key results that are potentially exploitable and the methodology that will be implemented throughout the project to make use of the results, and to specify the value and social impact of the activity to determine the stakeholders.

Exploitable results are products generated during the project that can generate an impact during and/or after financing; they are elements such as knowledge, technology, or processes that have the potential to contribute to future work, research, or innovation. Additionally, they can be used by the project partners themselves or by other interested parties.

Abbreviations

AB	Advisory Board
API	Application Programming Interface
CA	Consortium Agreement
CSA/CSE	Child Sexual Abuse/ Child Sexual Exploitation
DoA	Description of the Action, Annex 1 of the Grant Agreement
EC	European Commission
LEAs	Law Enforcement Authorities
IMA	Instant Messaging Application
IPFS	InterPlanetary File System
NER	Named Entity Recognition
NGO	Non-Governmental Organization
OSINT	Open Source Intelligence
THB	Trafficking in Human Beings
TRL	Technology Readiness Level
WP	Work Package

1. Introduction

Deliverable D10.19 aims to ensure future viability, planning, evaluation and strict control of the most important aspects of the project. Moreover, it aims, to ensure the self-sustainability of the outcomes of HEROES, with the generation of scalable strategies. Another objective is to explore other niche markets, while considering the commitment of the consortium with IPRs and knowledge sharing – open-source solutions, public deliverables, open publications and reports dealing with recommendations, access to research data, etc. Common guidelines will be defined at the beginning, paying attention to end-user needs and the marketplace while being coherent with the strategy, interests, and rights of the involved partners – the Project Coordinator will collaborate with the consortium contacts, technology transfer offices and public relations departments of the partners. All these aspects will be reflected in the exploitation plan (D10.9), which will be periodically updated (from M06 to M36 in D10.19, D10.20 and D10.21) to incorporate the latest changes and advances in the state-of-the-art, trends and competitors among others.

2. Exploitable and partners' exploitation vision

2.1. Key concepts

Exploitable outputs for the HEROES project comprise the potential exploitation of non-commercial and commercial oriented results.

- Non-commercial oriented results include the technological and methodological solutions created by HEROES. It will be oriented to knowledge transfer, policymaking and training activities towards the scientific community, LEAs, Multi-Stakeholders. and especially society to address THB and CSA/CSE crimes. Much of the knowledge will be transferred through training, conferences and periodic publications or briefings.
- Commercial-oriented results are solutions aimed at reaching the market in the short/medium term depending on the corresponding TRL. These results will feed the current product and service portfolio of the consortium partners. Others will be analyses in depth by the NGOs to choose the most appropriate exploitable action (e.g., licenses, partnerships, spin-offs, etc.).

HEROES will emphasize turning technological developments and research outcomes into value-creating products and services. The modularity of the proposed solution will allow partners to assess complementary strategies based on the flexibility of the results to be used in other systems and sectors. Figure 9 shows the TRL and SRL (actual and final) of each component of HEROES.

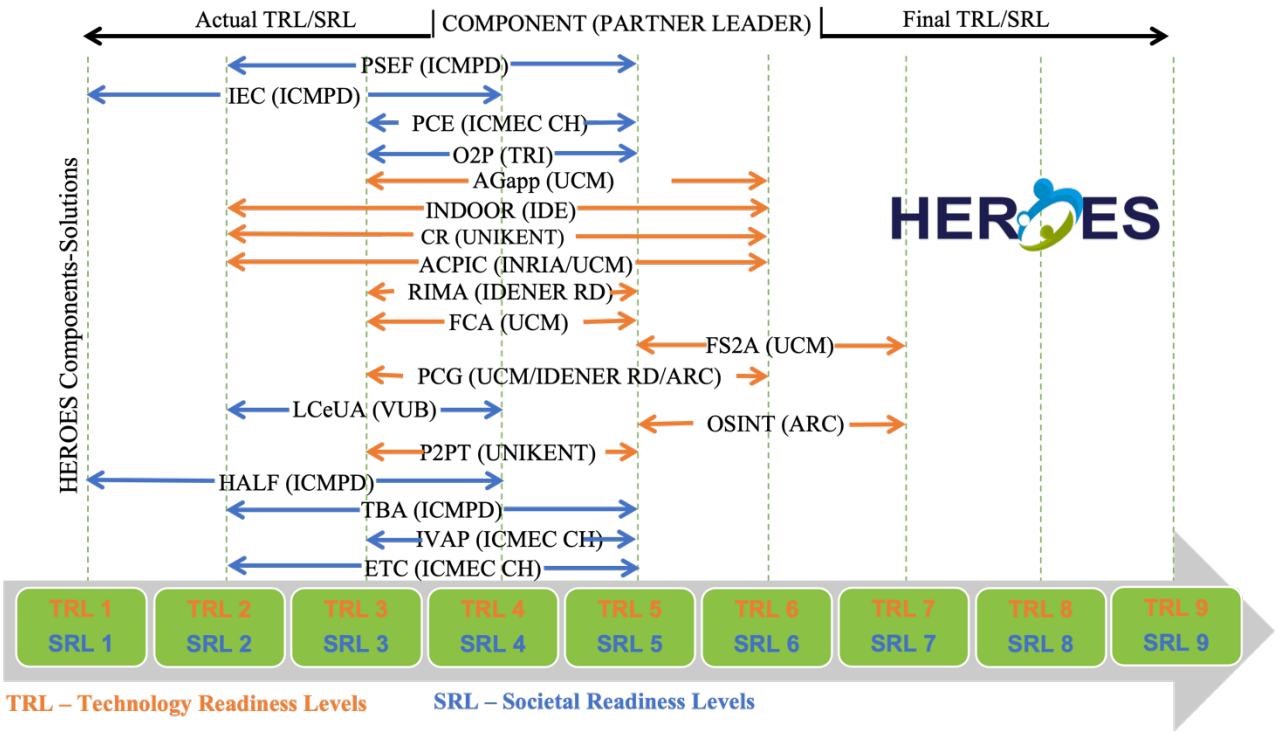

Figure 1. Actual and final TRL/SRL of the components to be developed in HEROES.

2.2. Roadmap

The Exploitation will be divided into a several phases:

- **Planning phase (M6 – M12)**: First Exploitation deliverable (overview of exploitation strategies).
- **Awareness raising phase (M13 – M24)**: Progressing and tracking exploitation activity.
- **Preliminary results and ongoing activity (M25 - M36)**: Analysis and assessment of impact and success of exploitation activities against key performance indicators, further refinement of exploitation strategies.
- **Final results and exploitation (M30 – M36):** Extensive public disclosure of final project results and outputs, analysis and assessment of impact and success of exploitation activities against key performance indicators, development of final exploitation plan.
- **Post-project phase (2 years post project):** Analysis and assessment of impact and success of exploitation activity, further engagement with another European programme to identify best practices to disseminate and exploit widely the added value of assets generated after the programme.

The more promising strategies will be updated and refined during the project, guaranteeing the compliance with the described guidelines and foreseeing a realistic approach as a complement to joint exploitation strategies and the possible business models outlined in the following sections.

3. Market analysis

The increasing crime rates and the sophistication of crimes across the world have further emphasized interest in developing advanced technology and intelligence as a solution to solve crimes. In fact, the growing interest in improving technological strategies has been one of the primary factors in forensic technologies' market growth. Forensic technologies are vital in criminal investigations, as rising numbers of criminal cases increase the backlog of pending cases. During the last few decades, THB, especially when involving sex trafficking, has grown dramatically with the introduction of new technologies THB includes a variety of forms of exploitation such as CSA. [1] A model applied in the UK identified important limitations about the gathering of data and processing of cases. Nevertheless, it is very important to build a solution that can include an evidence-informed approach of the victims. It is argued that technologies may be employed at each phase of the trafficking process. Additionally, a limited budget of LEAs avoids a better approach to mitigate this kind of threat [2]. Technology should improve our comprehension of how people find themselves in exploitative conditions. It is necessary to investigate how technological advancements can guide us with the difficulties of THB practices. Moreover, LEAs need to know if their interventions against counter-trafficking impact the victims [3].

Everyday LEAs makes use of several tools that help mitigate the THB and distribution of CSAM/CSEM. For the side of THB is possible to find tools designed for non-profits, companies, or government and law enforcement agencies. These tools are divided into several types such as Image Recognition, Awareness, Reporting, Data Management, and AI [4]. In [5], the European Commission carried out the evaluation of 10 commercial tools for fighting against CSA, demonstrating that there is no an integral comprehensive tool that solves this problem as a whole, and each tool provide different specific functionalities (Face detection/age estimation/context analysis among others). In addition, some tools are dependent on others, which could imply a significantly high additional license cost [6], [7], [8], [9], [10], [11], [12], [13]. Moreover, the use of all tools functionalities strongly depends on the specific legislation of each country [14], [15]. Although free tools are widely available, integrated missing.

Projects with such an impact should be globally supported by government and academic organisations, in collaboration with United Nations Agencies [16] (external expert advisor of this consortium) and child rights NGOs to be effective in the formulation of international plans of action. Therefore, it is necessary to have an integrated platform that addresses the problem as a whole at global scale and complies with current legislations. This solution should be in accordance with the short/medium/long term impacts of the international plans of action in the context of Trafficking of Human Beings and Child Sexual Abuse investigations. In this context, a broad market of technological innovation for the entire consortium will be developed, especially for LEAs and organisations that deal with this type of crime. The technological innovation market will be expanded as the implementation of high-tech methods, techniques, resources, and methodologies are developed and deployed in HEROES solution. Big-data technology will increase research capabilities, creating more opportunities to evolve and expand niche markets. According to [17], the European Parliament forecasts annual growth of 236% in data generation and 1.9% PBI growth by 2020. There are also alternatives at European level such as the European Network of Centres of Excellence in Big data which promotes cooperation between leading centers in Big data, Universities, and LEAs. Finally, OSINT tools have revolutionized the data collection market, and are currently used in all security organisations worldwide [18]. These experiences acquired by LEAs are vital to create a safe technological environment open to the international opportunities that the market demands.

4. Business model

The HEROES business model will make it possible to clearly define what the consortium wants to offer to clients (LEAs, Multi-Stakeholders and Society), how the work will be carried out and how to generate commercial opportunities. Figure 2 shows the initial business model of HEROES. For this, they use the canvas business methodology that will help HEROES to be a successful project. However, during the first months of the project, it will be improved by using other methodologies such as Lean Start-up and Disciplined Entrepreneurship. The combination of methodologies in HEROES will allow us to accurately estimate cost aspects of the services, the positioning of our product and the relationship with other open-source tools. Sustainability is evolving, and so is our model. The HEROES solution aims to promote social leadership for a sustainable future. Therefore, they will update our working model while maintaining our commitment: the integrated and responsible management of sustainability. HEROES will adopt sustainability strategies from recognised companies that develop tools for forensic analysis, cybersecurity and cyber defense (Microsoft, Griffeye, Opentext) and organisations that establish strategies to combat emerging threats (United Nations, organisation of American States, Non-governmental organisations).

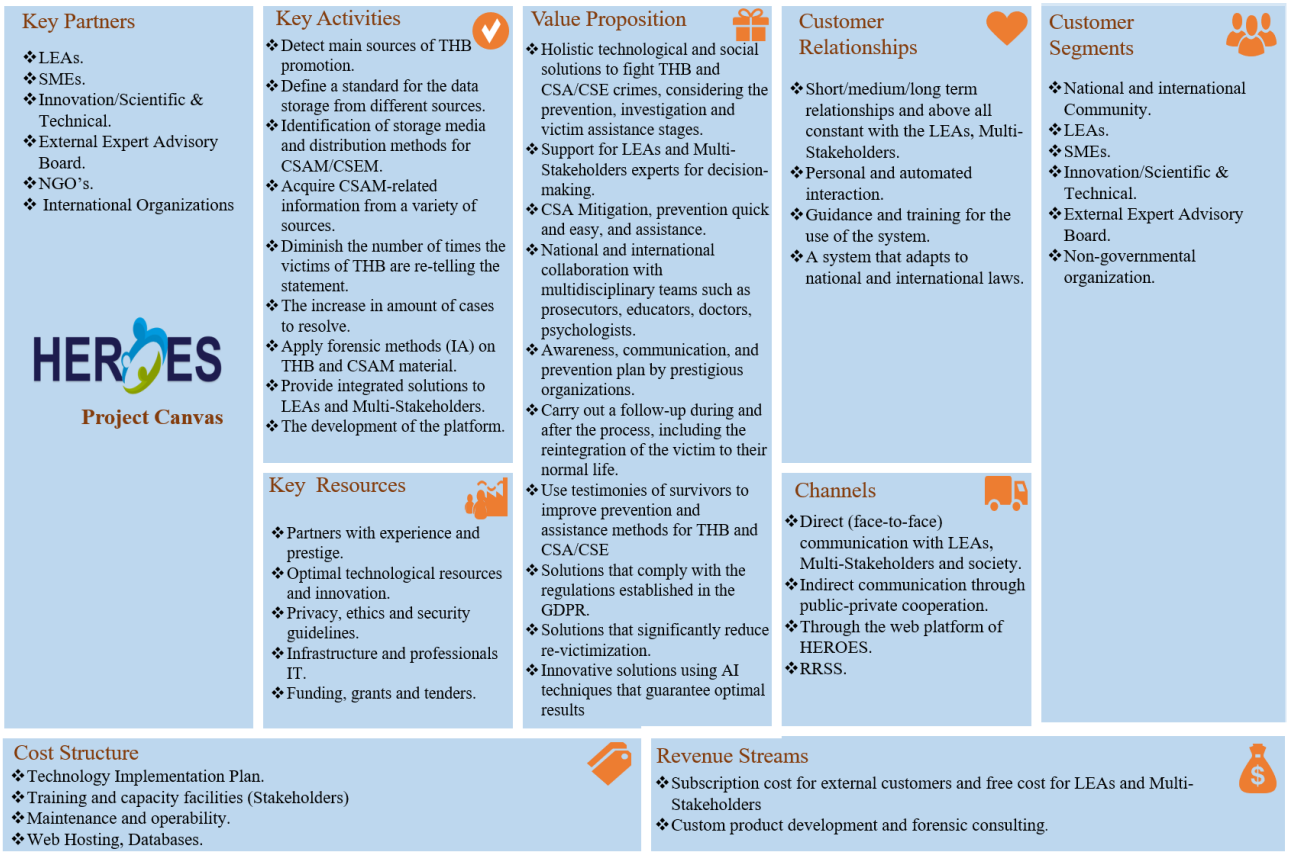

Figure 2. HEROES model canvas

5. Exploitation activities

5.1. Outputs of the project:

The HEROES project is structured as a comprehensive solution that encompasses three main components: Prevention, Investigation and Victim Assistance. Through these components, our solution aims to establish a coordinated contribution with LEAs by developing an appropriate, victim-centred approach that is capable of addressing specific needs and providing protection.

The Heroes project can therefore be divided into different modules:

- **Prevention Approach**: Regarding the proposed solutions to improve the fight against THB and CSA/CSE, the HEROES project presents different strategies that when combined can meet the objectives of (i) reducing the risk of being a victim of any form of trafficking in human beings and child sexual abuse, (ii) to increase citizen awareness and (iii) to increase and to facilitate citizen collaboration with LEAs and organisations involved in the fight against THB and CSA/CSE crimes, including victim support organisations.
- **Crime Investigation Approach**: Criminals use technologies such as social media, P2P networks, and the dark web to carry out their criminal activities to attract and exploit vulnerable people. Within the framework of the HEROES project, various tools are proposed that will help in the fight against THB and CSA/CSE, in order to catch and prosecute criminals and protect these vulnerable people.
- **Victim Assistance Approach**: As to the proposed solutions to improve victims' assistance regarding victims of THB and CSE/CSA, HEROES project will develop preventive measures to ensure adequate protection and assistance for these victims, by means of implementing training programs to LEA and multi-stakeholders practitioners, developing policies and strategies to policy and lawmakers to advance the rights of THB and CSA/CSE victims and developing a good practices book and guidelines for LEA and multi-stakeholders procedures concerning victims of THB and CSA/CSE.

5.1.1. Prevention Approach

5.1.1.1. Psychological, Social and Economic Factors that influence THB and CSA/CSE crimes (PSEF)

For early THB identification, the HEROES approach will make use of the existing research on determinants of trafficking, as well as the existing work in the anti-trafficking community on THB indicators. The innovation of the HEROES approach consists in critically analysing the understanding and operationalisation of "classical" factors determining trafficking (political, social, psychological and economic factors) and making use of results of the latest research on trafficking and CSA/CSE. Based on existing research on early identification of crime, HEROES will develop a series of studies to develop tailored methodologies/tools for early identification of THB and CSA/CSE.

The key exploitable results of this toolkit are:

- **Manual for early identification of potential victims of THB and of CSA/CSE**

  The Manual will present a general overview of THB and/or CSA/E in the countries under study and sector-specific indicators to spot those crimes in each country. THB and CSA/E may overlap or happen simultaneously in many cases. The contexts and indicators of these phenomena are likely to be complimentary at best and supplementary at least, allowing for cross-identification.

5.1.1.2. Prevention Campaigns and Education (PCE)

HEROES will develop prevention and education plans aimed not only at the general public but also at groups identified as being at risk. In this sense, the collaboration with the organisations participating in our consortium will be direct, because each of these organisations is aware of the reality of their workplaces and therefore the focus that should have each of the campaigns to be carried out. HEROES project will develop a detailed description of training to be taught during prevention and awareness campaigns carried out for the duration of the project.

The key exploitable results of this toolkit are:

- **Enhanced training curricula on recognizing, intervening, and preventing various forms of sexual violence**

  The purpose of this task is to create specific learning methodologies, training curricula and materials to respond to the needs of relevant stakeholders in specific countries, selected based on the number of CSAM reports generated by NCMEC and other ICMEC CH partners. The aim of the training curricula is to strengthen the response capacities of the relevant authorities and to contribute to sustainable training capabilities through ToT manuals.

5.1.1.3. Anti-grooming Mobile App (AGapp)

HEROES propose the development of an Anti-grooming mobile App to automatically identify and block the sending or receiving of inappropriate content over IMA and OSN. The AGapp tool will be installed on the children's mobile devices by their parents and will be the "firewall" to avoid grooming. HEROES, to develop the AGapp tool, will use a secure Federated Learning approach to build machine-learning models based on datasets that are distributed across multiple devices while preventing data leakage and overall, in accordance with the EU GDPR.

5.1.1.4. Identifying Fake Job Offers (INDOOR)

HEROES project proposes the development of an application that through the use of OSINT and AI algorithms, will be able to identify possible fraudulent job offers. The tool will be similar to an anti-phishing system. INDOOR will use the information published in the offer (company name, web address and business mail, contact phone, etc.). Through this information and with the use of the OSINT tools, the system will look for information related to the veracity of the introduced data. Once processed and contrasted, the result is stored so that in future searches with similar input data, the response will be faster and more acurate.

5.1.1.5. Citizen Reporting App (CR)

The tool proposed by HEROES will be focused on the recognition and reporting of THB and CSA crimes. The application will provide a simple and interactive explanation that will introduce the user to collaborate with the police, identifying possible cases of child trafficking and sexual exploitation. The application will be developed, considering all the languages of the member states. In addition, all reported complaints will be communicated to local authorities to be attended, but also serve to identify possible hot spots of illegal activity, for this, the application will have geolocation and image capture functionality if necessary.

5.1.2. Crime Investigation Approach

The key exploitable results of this toolkit are:

5.1.2.1. Automatic CSAM/CSEM Identification and Classification Tool (ACPIC)

HEROES propose the development of a tool specialised in the automatic detection and classification of CSA/CSE material. To achieve this objective, HEROES will develop artificial intelligence models that are capable of estimating age and identifying the context of the content not only considering nudity as a determining factor for sensitive material and possible CSA/CSE content. Therefore, the development of algorithms based on Convolutional Neural Networks (CNN) for gender estimation and based on DeepUAge for estimating age will be carried out. Likewise, the algorithms for the automatic classification of CSA/CSE material supported by object and background recognition models. These automated capabilities will help LEAs spend less time processing and examining evidence and will lead to more accurate identification results.

5.1.2.2. Profile/Content Generator (PCG)

The main idea is to propose the core mechanisms and requirements of a cyber investigation tool that is able to verify the digital traces to help investigators to be able to find clues and evidence regarding a particular case, suspect or context related to a particular subject.

5.1.2.3. Open-Source Intelligence Tools (OSINT)

The Open Source Intelligence (OSINT) refers to the intelligence gathering of intelligence of public information from publicly available sources, such as Media, Web-based communities like forums, wikis or social networks and public data like reports, press conferences or academic papers. This process is not always easy and requires technical skills such as knowledge of search engine operators for filtering the results of the search, knowledge of specific Websites and Search Engines and their APIs, hands-on experience with web scraping in order to extract the data from websites which do not have API and experience with OSINT tools in order to do not reinvent the wheel and to adapt these tools to the needs of the project. HEROES will provide the LEAs with a set of tools to extract data from the surface web, the Deep Web and the Dark-net related to THB and CSA/CSE crimes

5.1.2.4. Real-time Instant Messaging Application Content Acquisition (RIMA)

Heroes will research the feasibility of tracing illegal activity in IMAs, and then, automated tools to store relevant data will be developed. The research will be focused to the analysis of secure IMAs, such as WhatsApp, Telegram, etc. to determine whether the underlying APIs and/or use of cryptographic primitives contain vulnerabilities that can be used to exfiltrate information and digital evidence regarding THB and CSA/CSE.

5.1.2.5. P2P CSAM/CSEM Identification Tool (P2PT)

HEROES will develop a modular tool in which the main component (base tool) will use the features shared and defined by the most popular p2p networks (e.g., hashes, file names, etc.). On this basis, the development of specific plugins to address each of the networks and their characteristics will be performed. This tool would also allow studying activity patterns of offenders who transmit and/or share CSAM. This will allow us to identify those IPs that are more active and share the most material, therefore, possible content creators. Also, during the development of the HEROES project, they will carry out an analysis of the feasibility of the identification of CSAM/CSEM streaming content to enhance the investigation capabilities of the EU LEAs.

5.1.2.6. File Context Analysis from Seized Devices (FCA)

HEROES will implement algorithms based on Natural Language Processing (NLP), also called Topic Modeling and NER, which will allow to obtain precise search results based on the content of those documents. These algorithms are based on the clustering words of a document and subsequently defining that cluster,

depending on its composition, with one or more themes or topics. Thanks to this, they will be able to identify documents that have one or several types of content all and that do not refer to it explicitly. Furthermore, it will be possible to incorporate tailored word dictionaries, developed within the help of the local LEAs, to make the topic-modelling based tool more accurate based on the language and particular context of each country where it is used.

5.1.3. Victim Assistance Approach

5.1.3.1. Integral Victim Assistance Program (IVAP)

The development of a Comprehensive Victim Assistance Programme in the framework of Multidisciplinary Victim Assistance strategies to avoid re-victimisation of victims (WP7) has a twofold objective, on the one hand, to cover both the victim assistance perspective and the success of investigations, on the other hand, the perspective of victim assistance and the success of investigations, on the other hand, will prove to be effective in preventing, ending victimisation and avoiding secondary victimisation. To this end, the HEROES project will study and propose guidelines and protocols for the identification of the traumatic link in victims, followed by recommendations; the rights of victims and their particular needs, and an appropriate training and intervention plan for health care workers and other health care workers and other professionals who health workers and other professionals caring for children, also in the perspective of a victim-centred approach.

Local authorities and other professionals in contact with victims of CSA/CSA and THB should be aware of the fundamental rights of victims and be sensitive to their needs of victims.

The key exploitable results of this toolkit are:

- **Best practices guidelines for trauma bonding identification protocol**

  The goal of this task is to develop a protocol to identify signals of trauma on THB and CSA/CSE victims. This protocol will allow, to the government officials, NGOs and service providers, recognizing when the survivor has experienced trauma bonding. In addition, this recognition will improve the victim's assistance program by making recommendations for the development of specialised programmes that address the psychosocial impact of the CSE/CSA and THB experience that will increase a victim's ability to break the trauma bond.

- **Guidelines for awareness and victims' assistance resources addressing governments and stakeholders to follow on investigation and prosecution**

  Carry out protocols for the care of THB and CSA/CSE victims, with a focus on prevention, investigation and prosecution, focused on the victim, thereby achieving non-revictimisation, and proper intervention of actors and proper use of resources for proper criminal prosecution.

5.2. Exploitation Plans per partner

UCM prepared a questionnaire that was circulated to all partners. They analyse herein the responses sent by all partners taking into account their nature (Technological partners, NGOs, LEAs, universities focusing on Social Sciences and Humanities, etc).

The preliminary vision of each partner's individual exploitation plans (to be updated and refined during the execution).

Organisation Type (Partner) | Exploitation interests and strategy:

- **UNIVERSITIES (UCM, UNIKENT, VUB):** The results of the research activities of HEROES are novel enough to ensure a strong scientific impact, disseminating the research results with publications on high level conferences and impact journals. Much of the topics tackled in HEROES will be

considered as topics for master and PhD. thesis offering to students work in innovative research problems with practical impact.

UCM expect to make an impact in crime reporting, digital forensics, digital forensics readiness, child safety. The needs that could be solved by the results would be:

- Faster and more effective child protection, in cases of CSAM identification, anti grooming reporting incidents
- Faster reporting to LEAs with the respective evidence
- Improvement of the identification of CSA/CSE material in images and videos

Also, UCM outputs will be:

- CSAM/CSEM identification
- Anti-grooming tool
- Content context analysis tool
- PCG

The results will be available to LEAs (for testing, use and maintenance purposes), NGOs and General Public.

Regarding the estimated time for commercialisation of the results, the aim is currently not to commercialise the research results, but to develop tools to facilitate LEAs.

Potentially, the results could be commercialised and made available to countries outside the EU, promoted by European LEAs.

Finally, UCM expected the following TRLs:

- CSAM/CSEM identification: TRL 6
- Anti-grooming tool: TRL 6
- Content context analysis tool: TRL 5
- PCG: TRL 5

UNIKENT expect to make an impact in crime reporting, digital forensics, digital forensics readiness, child safety. The needs that could be solved by the results would be:

- Faster and more effective child protection, in cases of identified CSA/CSE and THB by citizens
- Faster reporting to LEAs with the respective evidence
- Improvement of the identification of CSA/CSE material within P2P networks
- Better understanding of child protection and the needs that it has

Also, UNIKENT outputs will be:

- CSA/CSE and THB report application and webpage
- P2P CSA/CSE identification tool
- Adoption of novel technological paradigms, such as image similarity using perceptual hashes

Improvements over other tools, UNIKENT expects to have more accurate results, tools developed based on novel technological paradigms and citizens involvement. The results will be available to Europol (for testing purposes), citizens (reporting application), LEAs (for testing, use and maintenance purposes), NGOs and stakeholders. In addition, UNIKENT expects to use the results in the following fields:

- Cyber Security- Digital forensics(readiness)
- Crime report
- Children Safety
- Smart Cities

UNIKENT outlines the main advantages of the new solution(s) it expects:

- Safer Internet, especially for children under the supervision of parents and specialists
- Visibility of CSA/CSE and THB cases and the danger for children and potential THB victims
- Educational sessions for children, parents, LEAs, tutors, citizens, etc.
- Novel technological paradigms for fighting CSA/CSE and THB, available to LEAs and citizens. In terms of what the results will look like, they will include direct results (such as a manual, a test, a model, a new therapy, a better product or process, or a better understanding of mechanisms) and indirect ones (such as reduced use of materials or energy, improved safety, or improved staff training)

UNIKENT identifies the following elements as direct:

- Citizens report to LEAs, test of the application
- Improved version of existing tools, such as iCOP and RoundUp

After completion of the research and innovation, UNIKENT proposes the following examples of how to apply the obtained results and practice:

- Standards and the chain of custody to be agreed on
- Testing
- Financial support
- Creation of training sessions for the users

Regarding the estimated time for commercialisation of the results, the aim is currently not to commercialise the research results, but to develop tools to facilitate LEAs.

Potentially, the results could be commercialised and made available to countries outside the EU, promoted by European LEAs.

Finally, UNIKENT expected the following TRLs:

- Task 5.1: TRL 2-6
- Task 8.4: TRL 3-5.

Additionally, **VUB** will expand its expertise, while also getting its legal research closer to a multi-disciplinary and cross-sector consortium.

The results of their tasks will ensure the legal and ethical feasibility of some of the sensitive technologies developed within the HEROES Project and improve the development of tools to assist the multidisciplinary response of the rehabilitation of offenders and THB victims.

VUB expect to make an impact in academic field. Also, VUB outputs will be:

VUB will intently turn the deliverables into articles published in peer review journals. VUB will also disseminate the findings of the deliverables in conferences.

In addition, the outcomes of the deliverables would also be the starting point for a PhD of an FRC member.

The results will serve as a basis for the technologies and protocols being developed in the framework of the HEROES project. In particular, T4.2 and T4.7 will help the HEROES Consortium to comply with the relevant legal and ethical framework enhaced covert research, especially when developing the Profile/Content Generator in WP6. In the case of T.5.3, the initial element of this study would be to understand the experiences of convicted perpetrators of human trafficking with their crimes and to identify the best measures to rehabilitate them. Finally, T7.1 will serve as the basis for the development of cross-sectoral protocols, guidelines and training plans aimed at identifying and addressing signs of trauma, while avoiding any risk of re-victimisation in Work Package 7.

The outputs of the project would be made available on PURE, a research portal used by VUB which provides all ongoing and completed research projects and contains biographical information on our researchers and their teams. The portal also functions as an institutional repository where you can quickly find a wide range of open-access publications.

Many potential users would benefit from their results including scholars, AI developers, and NGOs working in the field of THB.

The main obstacles to the implementation of any of its results are shown in Table 1 below:

Regarding the estimated time for commercialisation of the results, the aim is currently not to commercialise the research results, but to develop tools to facilitate the work of LEAs.

Table 1: Tackle the barriers for apply the results (Universities)

Barriers	Solution
Inadequate financing	- Seek for collaboration with third party companies - Financing covered by other projects
Skills shortages	- Collaboration with other staff members - VUB network
Regulation that hinders innovation	- Comply with current regulation
Intellectual property right issues	- Results are owned by the beneficiary that generates them (grant agreement)
Traditional value chains that are less keen to innovate	- Creation of existing tools but more innovative
Incompatibility between parts of systems (lack of standards)	- Employment of particular standards from the beginning of the project
Mismatch between market needs and the solution.	- Their results will comply with the needs of LEAs and the Project.

- **RESEARCH INSTITUTES (INRIA, KEMEA, ARC):** INRIA can provide state-of-the-art robust algorithms for accurate analysis of human behaviour from video data. The face analysis group can deliver accurate algorithms and tools to estimate emotion, gender and age, and object recognition. The focus of INRIA will be to advance the state-of-the-art in Deep Learning in these areas. KEMEA as the think tank of the Hellenic Ministry of Citizen Protection regarding security policies, R&D and innovation actions will bring the HEROES project's outcomes to the attention of the Ministry and to the associated entities. KEMEA will use the project's findings to enhance its consulting and research services and portfolio.

  KEMEA expects to make an impact added value towards all axes of prevention, investigation and victim assistance and generally a tool able to enhance the battle against the aforementioned crimes for all actors involved in the process.

  The needs that could be solved by the results would be:

- All end user requirements (D.2.3.) are being recorded and taken into account by technical partners, so that the outcome fits the needs of the end users. Moreover, transnational legal differences will be spotted and compromised to a certain extend, while also good and bad practises towards victims' treatment will be of significant importance in order for them to be treated the best way possible.

Kemea contributes mainly on WP2 regarding best-practices specifications, requirements and use cases definition, while also supports tasks regarding pilots on use case preparations.

In terms of improvements compared to other tools, KEMEA it involves tools that are innovative and others that are complementary to already existing tools. It involves a large scale of stakeholders starting from citizens up to the prosecution phase. By certain tools and according to their integration into national contexts court admissible evidence can be at times be created while also time-efficiency regarding investigation is a key component of the whole toolkit.

KEMEA identifies the following elements as direct:

- Citizens
- NGO's
- LEAs

In addition, KEMEA expects to use the results in the governmental entities to help raise awareness of the public by incorporating online modules that involve citizens in reporting of the aforementioned crimes.

After completion of the research and innovation, KEMEA proposes the following examples of how to apply the obtained results and practice: incorporation in national legal frameworks, further financing, promotion to policy-making stakeholders, training.

ARC will further extend the results obtained from LOCARD and push further innovations in the direction of detection and prevention of online deviant behaviour and expect to make an impact in Cyber threat intelligence.

The needs that could be solved by the results would be:

- Monitoring of less supervised online services.

Also, ARC outputs will be:

- New OSINT feeds.

In terms of improvements compared to other tools, ARC identified the next items:

- Correlation with other sources,
- Monitoring of platforms which are not currently under the radar, e.g. IPFS.

The results will be available to LEAs (for testing, use and maintenance purposes) and threat intelligence companies.

ARC outlines the main advantages of the new solution(s) it expects:

- By monitoring IPFS one would be able to determine which IP initially uploaded CSAM or other illegal content (e.g. IP infringement in the case of movies), malicious content (e.g. malicious payloads) and who is currently serving/storing this content.

After completion of the research and innovation, ARC tools are expected to have a TRL up to 6. While in terms of functionality they are expected to be fully working and operational, collecting the data and

scaling them requires additional effort which is more applied and industry oriented, to e.g. host it on the cloud and make the proper scaling adjustments.

The main obstacles to the implementation of any of its results are shown in Table 2 below:

Table 2: Tackle the barriers for apply the results (Research Institutes)

Barriers	Solution
Inadequate financing	- Chances for further eu financing can be exploited. - Approach EACTDA for post financing of the tools, discuss with venture capitals
Skills shortages	- Trainings should be designed - Hire proper people from the industry.
Regulation that hinders innovation	Proposal can be drafted to stakeholders
Intellectual property right issues	N/A
Traditional value chains that are less keen to innovate	Awareness campaigns
Incompatibility between parts of systems (lack of standards)	N/A
Mismatch between market needs and the solution.	Discuss further with end users

- **INTERNATIONAL ORGANISATIONS (ICMPD): ICMPD** will contribute to HEROES activities from a social science perspective. Both the Research Unit and the Anti-Trafficking Programme will lend their expertise. ICMPD will draw from its internationally tested methodologies to generate evidence-based knowledge, as well as policy tools, to improve LEAs' criminal response and feed their systems with accurate parameters. ICMPD will also contribute to capacity building activities, producing curricula, plans, methodologies, and assisting the application of such tools during pilot training. For ICMPD, the impact of their work would be in the academic and scientific community, on the one hand, and the policy and practitioner community, on the other. This includes knowledge transfer, policymaking and training activities towards the scientific community, LEAs, Multi-Stakeholders and especially society to address THB and CSA/CSE crimes. Much of the knowledge will be transferred through training, academic and policy conferences and scientific publications.

  The needs met based on their tasks would be better understanding of and tools for response to online cases of trafficking in human beings in particular, among the scientific and practitioner/policy community.

  In addition to the public Deliverable 4.4, ICMPD will also produce academic outputs related to the research conducted under WP4. In addition, ICMPD will contribute to the training plans for anti-trafficking stakeholders, developed under the project.

  Improvements over other tools, ICMPD's training materials link up to and make use of other training material produced in this field. Thus, the training materials build on and therefore improve practical tools accessible by anti-trafficking practitioners in their everyday work. Moreover, the knowledge produced can serve as evidence and as a basis for further training materials for law enforcement agencies and civil society front-line responders in the countries in which ICMPD operates. Additionally, the case studies and indicators established contribute to improved policy relevant knowledge for governmental institutions dealing with early identification of victims.

  The results will be publicly available outputs produced by ICMPD will be made available on ICMPD's website (www.icmpd.org) and disseminated to key academic, policy and practitioner stakeholders in ICMPD's network. ICMPD can also disseminate its results to key stakeholders in the anti-trafficking field with whom it regularly engages: ICMPD is currently the co-chair of the Inter Agency Coordination Group against Trafficking in Persons (ICAT) and a participant in the Alliance 8.7 platform with

partners globally. All members and participants of such platforms are expected to share their materials and publications so as to keep them abreast of new research and policy developments. Scientific outputs will be available in academic journals and other academic outlets (e.g. academic conferences such as the annual IMISCOE conference, etc.). The users of the publicly available qualitative social science research results would be relevant knowledge producers such as the academic community, research departments of international organisations, and institutions that conduct and/or commission research. The users of the practical tools developed by ICMPD would be anti-trafficking practitioners and actors in the policy world. Some examples of the users of the practical tools are THB and CSA/E front line responders or those in charge of case identification, such as the police, labour inspectors, border officials, and even health and education professionals. Also, non-government stakeholders who work with vulnerable people will benefit from the knowledge and tools that are created to help them spot a possible victim and make the first referral.

ICMPD's research results and work in HEROES will build on and contribute to a body of work on trafficking, focusing on the link with ICT-facilitated cases of trafficking and relevant trafficking and CSA/E trends for the research countries. Therefore, for the academic and policy communities, the advantage is more up-to-date data on these particular aspects with regard to these crimes. With regard to the practical manuals ICMPD produces or contributes to, the results are quite direct, in terms of providing practitioners and HEROES end users direct access to these tools for use in their daily work.

Once the research is completed, ICMPD will examine how best to adapt the findings into policy-relevant recommendations, through for example a policy brief. For the practical tools, they will al ready be ready for use by practitioners.

- **SMEs (IDENER RD, TRI):** IDENER RD strategically invests in the research field of digital forensics, process engineering, data intelligence gathering, among others. To this end, HEROES is perfectly aligned with the goals of the company for the forthcoming years. The generated IP will be used to enrich its products that are provided to multi-stakeholders and commercially exploit them.

  Needs that could be solved by the IDENER results would be:

  - To prevent the online recruitment of potential THB victims (INDOOR tool)
  - Strengthen the capacities of LEAs and Multi-Stakeholders to investigate (INDOOR)
  - To optimise LEAs' automatic data collection procedures (RIMA)
  - To help LEAs' investigators carry out automated investigations (RIMA, PCG).

  Besides, three tools are going to be developed by IDENER in the execution of HEROES:

  - INDOOR tool: This tool's main objective is to identify whether a job offer is fair.
  - Real-time Instant Messaging Application Content acquisition (RIMA): This tool has three different parts: The first one is in charge of getting information from RIMA, the second one will process and determine which message can be interested in a LEAs investigation and the third one will create a report with this message.
  - Profile Content Generator (PCG): to propose the core mechanisms and requirements for requirements of a cyber-investigation tool that is capable of verifying digital traces to help investigators to be able to find clues and investigators to be able to find clues and evidence about a specific case, a suspect or context related to a context related to a specific topic. This tool is composed of different modules, one of them being one of the IDENER tools.

  Regarding the improvements over other tools, IDENER expects:

INDOOR tool: This solution will not be exclusively a single model; It will be the entire ML pipeline that integrates different stages to the proper and safer training of the model. It will be implemented following best practices in the MLOps field.

RIMA tool: The most significant improvements are the first part in getting information automatically about RIMAs.

PCG tool: The improvements are based on the feedback that end users can give us.

In terms of availability of the results, most of them are confidential. The rest of them will be published in a code repository like GitHub. Regarding the potential users of the tools, the main potential users of the tools themselves are LEAs or NGOs.

However, IDENER always aims to test the solution in different sectors (with other datasets), so there is no door close to the potential users. Besides, the direct result from IDENER will be different models and tools that can be offered as a service. Apart of course of other indirect benefits are better-trained staff.

Finally, IDENER expected the following TRLs:

- RIMA: TRL5-6
- INDOOR: TRL6-7
- PCG: TRL7

TRI will further refine its ELSI impact assessment approach and gain further experience in security technology development. It will use this to inform its consultancy work in privacy-by-design and ethics-by-design, and training on THB response, as well as informing its data protection officer service. TRI will use the text-analysis work on HEROES as a potential option for integration with its STRIAD risk assessment platform.

Tri will expect impact in ethical, legal, societal, privacy, policy, technology design, training. Depending on the results that they develop, they might be able to apply results to technology development conducted by TRI colleagues. Further, they are developing new knowledge regarding modus operandi for THB, and they expect to pursue policy impacts from this. Additionally, they expect to provide the training programme to the transport industry,

TRI will make contributions to these open questions. There are also open questions around how criminals engage in THB in the UK, particularly county lines and cuckooing, where TRI has collated new knowledge on the operation of criminal gangs. Further, open questions regarding how transport workers should best respond to indicators of THB will be answered with the training programme.

The knowledge, understanding about the ethical, legal, societal, and privacy impacts of LEA and NGO technologies intended to prevent and investigate CSA/CSE will then be included in TRI's impact assessment, Ethics-by-Design, and Privacy-by-Design methodologies in the future. TRI has engaged in dissemination of knowledge generated about THB modus operandi and intends to publish this work. The training programme to be developed will be available to use with TRI's private clients.

Improvements over other tools, TRI's inputs will help LEA/NGO tools in the area of combatting CSA/CSE be the most ethical, le-gally-compliant, privacy-aware, and societally acceptable version that they can be. TRI's public outputs will be made available on the project website/Cordis in deliverables. TRI will also engage in publishing research papers based on work completed in HEROES. TRI's training programme will be available from TRI's consulting business. Primarily, the knowledge, understanding, and technology design strategies developed in HEROES will be used by TRI staff in future projects and, potentially, TRI technologies. The training programme is expected to be used by TRI staff. In addition, TRI expects to use the results in the following fields:

There is potential for TRI's research to have an impact in the area of information security, data protection, and legal regulation, depending how our work on the ethical, legal, and societal impacts of 'breaking' end-to-end encryption progresses. The training programme could be expanded into different areas of transport, or into other domains.

TRI outlines the main advantages of the new solution(s) it expects:

TRI's research results in HEROES are primarily expected to be applied by TRI research staff in other research projects where tools are developed for combatting CSA/CSE, or adjacent technologies. The advantages will be that solutions to emergent ethical, legal, and societal issues discovered in HEROES can be applied to other technologies much quicker, and additional research can be conducted in future projects to develop further Ethics-by-Design and Privacy-by-Design strategies.

The training programme will be used by TRI's consulting staff to provide training to transport workers on indicators of THB. It will provide an advantage for transport workers who will be aware of how they can better protect THB victims, as well as advantages to THB victims who could be protected from abuse.

TRI expect to have direct results in the form of:

- better impact assessment processes for analysing technologies intended to be used for the combatting of CSA/CSE;
- better ethical and privacy design strategies;
- a training programme.

After completion of the research and innovation, TRI will be a process of refining the HEROES results for further deployment. For example, innovative ethical and privacy design strategies will need to be tailored to future applications, and the training programme will need to be tailored to the intended audience.

Regarding the estimated time for commercialisation of the results, where future research project, or private client, needs match TRI's outputs from HEROES, commercialisation can happen nearly instantly. Where adaption of TRI's innovations and results is needed, this will depend on how much adaption is needed.

For application of results to commercial products, private funding for personnel costs will be needed. The level of financial resources needed for bringing innovation to market will de-pend on the level of adaption needed.

Finally, rather than TRL, TRI's work is better viewed in terms of Societal Readiness Levels.

Impact Assessment methodology and ethical and privacy design strategies specifically for assessing tools used to combat CSA/CSE and THB are expected to progress from SRL 2 at the beginning of the project to 5/6 at the end. The training course is expected to progress from SRL 2 at the beginning of the project to 6 at the end.

The main obstacles to the implementation of any of its results are shown in Table 3 below:

Table 3: Tackle the barriers for apply the results (SMEs)

Barriers	Solution
Inadequate financing	- It will depend on the result at the end of the project, but our expectation is that they will not need more financing to commercialise the tools. - If external financing is not available, TRI will provide internal financing to apply strategically beneficial innovations from TRI to it's own products.
Skills shortages	- With the job already done, they know that they have enough skill. - Where TRI experiences skills shortages, it first explores internal capabilities or hires new talent to fill any gaps.

Regulation that hinders innovation	- It can be one of the main problems. The regulation that doesn't allow us to access data needs to develop the tools due to ethical issues. The only solution will be to create synthetic data. - TRI develops innovative approaches in harmony with new regulation, so as to remain in compliance.
Intellectual property right issues	- All the components that will be used have been checked previously and are completely open-source. - During collaborations in HEROES, TRI develops new IP separately from other partners to avoid IPR issues.
Traditional value chains that are less keen to innovate	- In a field as sensitive as Heroes focus. It is impossible to remove the person from the loop because all the tools have been developed with this in mind. - TRI explains the benefits of innovation and the process and technological designs that it can provide to more traditional customers.
Incompatibility between parts of systems (lack of standards)	- Despite not all the parts of the systems needing to be connected, the CASE Ontology will be used to facilitate the compatibility and adaptation of new users. - TRI has an internal process for linking research and commercial parts of its business to ensure compatibility.
Mismatch between market needs and the solution.	- It will depend on the result at the end of the project but our expectation is that they will not need more financing to commercialise the tools. - TRI develops new innovations with an eye toward future market needs. If innovations are developed without a clear market, TRI can conduct further innovation orientated toward market exploitation in future research projects.

- **NGOs (ICMEC CH, CWCS, KOPZI, APAV, RENACER, GCR, ASBRAD, GI-TOC):** The NGOs will be involved in qualitative study of THB and CSA/CSE prevention, investigation and victim assistance processes, identify barriers, use HEROES tools for early identification of potential victims, manual assessing barriers, remedies and harmful practices on treatment of victims. Assist in development of educational materials and undertake child rights promotion campaigns with stakeholders and children. The NGOs will use HEROES outcomes to restructure the national strategy towards THB and child exploitation victims including more scientific based approach to identification, support, integrate and follow-up them. The existing gaps in providing positive results while organizing the legal processes in the THB field will be covered by the advanced models developed by HEROES.

  ICMEC CH is an organisation that provides technical assistance to countries to strengthen their response capacities to the THB and CSA/CSE, for which it will provide the construction of protocol models and studies of the situation on prevention, research and attention to victims to promote legislative changes and public policies. ICMEC CH will also provide specialised training for the implementation of recommendations.

  ICMEC's tasks are focusing on Prevention and Victim's assistance. More specifically, their tasks will empower professionals to better care for children victims of CSEA and THB, raise awareness on the issues and give tools to prevent them from happening, and provide research on best practice and gaps on solving these issues in consortium countries.

  The identification of gaps in investigations and legislations in the countries in focus will encourage the development of solutions to fill up these gaps. Moreover, our tasks will support parents, carers, law enforcement units, judges, prosecutors, educators, medical professionals, and anyone with a duty of care towards children to know how to deal with conversations, suspicions, disclosure and reporting of CSEA and THB, and what follows.

  In terms of ICMPD outcomes, the professionals that will be trained under the HEROES project will have a better understanding of what (O)CSEA and THB are, why they might happen, how, by whom and on whom, and what to do if they happen. Especially, key stakeholders will have the tools to develop a protocol to care for THB and CSA/CSE victims and prevent re-victimisation. Moreover, adults with a duty of care towards children will learn about online CSEA and how to prevent it in an accessible guide full of useful and handy resources. Finally, national actors will learn about international best practices

and understand what they can implement to ensure that children are cared for in the best way possible, especially those who suffered through (O)SCEA, THB and those who go missing.

Regarding the improvements respect other tools, each product is based on the state-of-the-art research and available international knowledge on the issues and on the tools that are part of the solution to the issues. As crimes against children evolve with time, especially as technology changes and allows for more to happen online, updating the research, specialised training and guidelines provided to stakeholders is crucial to keep up with those who pose a threat to children. The HEROES project is enabling to create the most up-to-date products thanks to ICMEC's and the Consortium's expertise.

As for the availability of the results, two of the seven of our products are confidential and for the Consortium's use only.

Training plans and programmes, protocols and training will be accessible on the ICMEC website and colleagues can be contacted in case someone is interested in organising a live training event.

The guidelines will be widely disseminated using ICMEC and partner contacts as well as social media communication. They are planning to create a new microsite or landing page that will be linked to the ICMEC website for easy access, depending on the budget.

Targeted users, depending on the tasks, are parents, carers, law enforcement units, governments, judges, prosecutors, educators, medical professionals, and anyone with a duty of care towards children.

The target users, depending on the tasks, are parents, caregivers, law enforcement, governments, judges, prosecutors, educators, medical professionals and anyone who has a duty of care for children.

Regarding other technological field that could use their results, any telecommunication technology, social media organisations or Internet Service Providers could make good use of our tasks. They also believe that banking, including online and cryptocurrency companies, could benefit from our training and guidelines. Finally, any organisation dealing with forensics, domain registry, connected devices (such as laptops, smartphones, etc.) could find an interest in our solutions to fight CSEA and THB that might happen through their services.

In terms of the benefits of the new solution(s) it expects, ICMEC CH hopes that the results of its research will encourage stakeholders to address the gaps found: they expect governments to dedicate resources to fill these gaps and NGOs to support and draft proposals for solutions. They also envisage that their training sessions will provide tools and train professionals to use internationally recognised best practices in addressing the problems of CSE and THB, especially with children. Lastly, they hope that any adult who interact with children in personal or professional settings to know how to support children victims of CSEA or THB, and to have discussions and implement ways to prevent children from being victimised.

Their new training developed for the purpose of HEROES is a live training (which can happen online or in person), but they understand that not every professional will be available for long periods of time. A further step for more accessibility, thus more impact, would be to provide an e-learning on demand element, which is not doable within the scope of HEROES.

Finally, ICMEC will not bring its research findings to the market.

KOPZI is supporting persons who already are victims of Human Trafficking or sexual violence so KOPZI biggest impact could be proving secondary preventions to these persons or proving prevention action in the country in general. Also, it could quite be valuable to share with other NGOs or GOs in Lithuania the knowledge and tools of the project thus pushing the performance on a new level. Hopes of having kind of scientific methodologies in the fight against child rapists or human traffickers. The needs that could be solved by the results are:

- Lack of appropriate tools identifying grooming on the Internet

- Lacking knowledge about who the pedophiles are, how they behave etc
- Lack of effective ways for the victims to approach police or other entities

Also, KOPZI outputs will be:

- Verification of the created tools by the partners
- Training sessions inside the national country for the social workers
- Psychologists, municipality officers on the dangers of grooming or recruiting and using the visuals and guides created by the partners

Improvements over other tools, KOPZI will have a more scientific approach that is better structured and organized which will help with what is really important – allowing to see the whole picture and understand the causes and the consequences (e.g. trauma).

The results will be available on the website www.anti-trafficking.lt

Regarding the potential users, KOZPI has identified the following users:

- Actual and potential victims of THB
- Actual and potential victims of sexual violence
- Parents, community members
- Social workers
- Psychologists
- Police officers, prosecutors, judges

KOPZI outlines the main advantages of the new solution(s) it expects:

- The main problem in Lithuania in their field is a big lack of tools to identify, to support and to prevent crimes. So, once they have ones it will allow for the buildup of knowledge of the professionals thus in future, they hope to have less undetected crime against children or vulnerable groups in the communities. The positive impact on the national Child protection policy and anti-Trafficking policy is much expected.

After completion of the research and innovation, KOPZI proposes the following examples of how to apply the obtained results and practice:

- Standards to be agreed on
- Financing the testing
- Scaling up or production
- Promoting acceptance by consumers or other partners in a value chain.
- Policymakers may also establish follow-up steps to work the results into policies.

APAV is the largest not for profit and charitable organisation in Portugal with 30 years' experience in providing confidential, qualified and free of charge victim support services to victims of all crimes. APAV expect to make an impact in:

In the quality of CSO and, more specifically, a victim support organisation, they aim not only to ensure that a victim-centric approach is imprinted in each and every aspect of HEROES methodologies, activities and technologic tools, but foremost they expect victims of THB and CSA/CSE will be better protected, assisted and that their rights and needs are assured. In the victim assistance strand of HEROES

and by focusing on preventing and developing technologic tools for more effective investigations, four main impacts are foreseen:

- i) reducing primary, repeated and secondary victimisation.
- ii) contributing to specialised training and specialised support to victims, in accordance with specific needs of victims of THB and CSA/CSE and their rights as per provisioned in national laws, including that of access to specialised support services.
- iii) promoting victim support strategies focused on the specific needs of these victims, including the development of new practices within the justice system to avoid secondary victimisation and reduce the insidious impact of victimisation.
- iv) build upon project's findings to promote better procedures and outcomes in assisting victims of THB and CSA/CSE crimes, including but not limited to cooperation procedures between all relevant stakeholders (both at national and transnational level, namely cross-border cooperation) and improved victim support procedures.

The needs that could be solved by the results are:

APAV is leader of Work Package 9 – Test Cases Implementation and Validation, with the central objective of validating HEROES' tools and outcomes through several pilot-cases to be conducted at EU and Latin-America LEAs level, who will pilot the technologies developed in real environment. WP 9 provided opportunity for LEAs to obtain practical experience with the tools developed and their ability to use such systems effectively will also be assessed. Within the work plan, the consortium will verify whether the tools are aligned with the requested TRL's, whilst allowing for a more concrete perspective on the impact technology will have in fighting against crime. An innovative curriculum will also be designed aiming at creating a network of trained LEAs in using advanced technology in their criminal investigation work, including those involved in the pilot exercises. Bearing the above in mind, tasks will support HEROES in ensuring that challenges and difficulties experienced by LEAs and NGO's (end-users) are encompassed in the technologic proposed solutions, whilst assessing the way they will have an actual impact in their daily work of preventing and in estimating THB and CSA/CSE and supporting its victims. Due account for victims' rights and needs will preside the design and implementation of the work plan (Pilot design and specifications, D9.1 and Final Pilots Validation Report, D9.8). More objectively, the results of APAV's tasks will allow HEROES to assess if the use-cases and the scenarios therein (within each specific challenges are already outlined and identified under WP2, D2.2), combined with technologic solutions, respond to the issues/challenges and needs posed by end-users, namely:

- The need of effective OSINT tools to gather important intel regarding the main criminal activities and also other criminal offences that might be associated to a specific case under investigation.
- Identify if anonymity techniques are being used to mask the real IP address of offenders.
- Training for relevant LEAs on usage of the technologic tools, without losing a victim-centric approach throughout their investigations.
- Automation of the detection processes of CSA/CSE, and cross-checking with existing CSA/CSE databases, in order to better identify if LEAs have encountered new content.
- Interoperability of some of the tools with different platforms (for instance, social media and instant-messaging platforms), whilst being available for operation by different investigators that are assigned to a specific criminal investigation remotely.
- Reporting application that safeguards whistle-blowers anonymity and, at the same time, provides the ability to share relevant data with LEAs (e.g., attachment of photos, videos or links);

- A toolset capable to retrieve information about the source, authenticity and/or the type of manipulation of a given file.

Further to the prior, the methodology will allow the consortium to build reliable, coherent and consolidated solutions in accordance with both the expectations/needs of end-users and safeguarding the needs and rights of victims of CSA/CSE and THB. In fact, the methodology to be adopted are deemed essential to adjust the technologic solutions in terms of: - Impact; - Usability; - Functionality; - Efficiency. Bearing in mind that the proposed solutions aim to improve the prevention, identification and victims' assistance, the implementation and completion of all tasks must include a victim-centric approach. In order to ensure that such an approach is put in place, not only awareness will be raised towards victims' rights and needs, but end-users will also be called upon to offer their insights as to whether the technological solutions will support them in interacting with victims of CSA/CSE and of THB, whilst promoting a victim-oriented investigation. In a similar fashion, technology developers will provide a more concrete perception of how victims' rights and needs were considered throughout the development of the technologic solutions, as well as whether specific features were introduced to ensure due safeguards. With regard to use-cases combined with technological solutions assessed during the pilots' phase, a number of challenges posed by NGOs towards use-case scenarios shall be duly accounted for:

1. The importance of a maintaining a strong cooperation between NGOs and LEAs to strengthen their capacity of addressing the different scenarios (e.g. if LEA's share with NGO's examples of, for instances, fake job offers, the latter will be more capable not only to identify more cases of fake job offers but also to identify an increased number of potential victims; furthermore, awareness raising campaigns targeted to vulnerable groups and the general public could be developed, not only towards the dynamics of THB and how to better identify fake job offers but also on both support services and where and how to safely report the - potential - crime.).

2. In this sense, reporting tools should give access not only to a LEA response/contact details but also should activate/give information about local Victim Support Services.

3. Technological tools should also empower victims to take immediate action by providing relevant information (e.g., individual assessment of needs and risk assessment tools), as well as information/contacts of Victim Support Services and of tools that may help mitigate the impacts of the victimisation (e.g., self-help tools, informative contents).

In addition, APAV outputs will be:

- design the pilots, the methodology for their implementation and establish how results will be comparable (D9.1).
- evaluate the information and data collected from the pilot phases I and II, determining whether they were effective in terms of correct execution and reliability of results (D9.8). To this end, questionnaires will be developed to assess the degree of adherence of the investigative tools by LEAs after using the technologic solutions. These tasks will furthermore be subject to 2 reviews to guarantee the effectiveness of use cases, technologies, needs and requirements.

No products or technologies will be developed by APAV.

Improvements over other tools, KOPZI will have a more scientific approach that is better structured and organized which will help with what is really important – allowing to see the whole picture and understand the causes and the consequences (e.g. trauma).

During the project, outputs will be made available to the whole consortium and, where applicable, to other relevant stakeholders that might be involved in their development or might be potential end-users (for instances, the Portuguese Police "Polícia Judiciária", with reserved competence to investigate

CSA/CSE and THB). After the duration of the project, the outputs and underlying methodology are prone to be made available/published in digital platforms and widely disseminated for replication and further exploitation.

Regarding the potential users, APAV has identified the following users:

- LEAs
- NGO's
- Potential victims of CSE/CSE and THB

APAV outlines the main advantages of the new solution(s) it expects:

HEROES aims at strengthening and enhancing a coordinated response to LEAs and other stakeholders in relation to prevention, investigation and assistance to victims of CSA/CSE and THB. In this sense, expectation falls on the development and wide exploitation of the methodologies, procedures, technologic tools and cooperation procedures (of national, European and International scope) to:

- Prevent THB and CSA/CSE, not only by way of piloted and validated technologic solutions, but that will also allow for increased public awareness towards the phenomena and the modi operandi used by cyber-offenders, whilst offering possibility of increased participation of diverse social actors in identifying potential victims and sources of THB and CSA/CSE.
- Investigate THB and CSA/CSE, through innovative technologic tools, specifically designed to address the daily-investigative needs of LEAs, including challenges that arise at technical, ethical and legal levels and that are intimate linked to the criminal phenomena under study.
- Assisting Victims of THB and CSA/CSE, namely by way contributing to reduce primary, secondary and repeated victimisation, whilst building the capacity of stakeholders to imprint victim-centric procedures and victim support strategies focused on the specific needs and rights of these victims, including new practices within the justice system to avoid secondary victimisation.

Successful implementation and impact achieved through HEROES, with due exploitation of its outputs and outcomes, will therefore carry the following advantages:

- New tools, methodologies and procedures that will allow for early identification of victims of THB and CSA/CSE.
- Knowledge and procedures providing a thorough assessment of barriers, remedies and harmful practices on treatment of victims.
- Provide for robust evidence, data and tools to advocate for a restructure national strategy towards THB and CSA/CSE.
- After completion of the research and innovation, APAV proposes the following examples of how to apply the obtained results and practice:
- Promote and advocate for a restructure of national response (including policies, cooperation proto-cols, adoption of a victim-centric approach and improved victim support procedures) towards THB and CSA/CSE

Fundación Renacer is a non-governmental non-profit organization that has been working in Colombia since 1988 for the prevention and eradication of trafficking and commercial sexual exploitation of children and adolescents based on three lines of action: Comprehensive assistance to victims, prevention and investigation.

Renacer will hope to have an impact on the travel and tourism sector, especially on virtual platforms such as Airbnb, Uber and strategic allies in the Colombian context that are active in international contexts (Avianca and airports).

Needs that could be solved by the results are:

- Generate awareness actions for tourists to reduce the demand for CSE.

Besides, Renacer outputs will be:

- The general design of advertising strategy.
- Manual with the methodological design of training and design of the campaign so that it can be replicated

Regarding improvements over other tools, Renacer will improve various platforms in the context of travel and tourism.

Respects the results available, Renacer will be in charge of generating the storage of information and materials that arise within the project. It is estimated that a micro-website can be created that allows said access to interested parties.

Regarding the potential users, Renacer has identified the following users:

- Airlines, tourist service providers, and state tourism entities in Colombia.

Renacer outlines the main advantages of the new solution(s) it expects:

- The strategy is expected to be usable by stakeholders in the travel and tourism context.

In terms of the kind of output (such as a manual, a test, a model, a new therapy, a better product or process), Renacer highlights two:

- Better qualified staff, with a sense of ownership and attentiveness to child protection needs in the context of travel and tourism.
- Methodological document for the development of future communication initiatives (training, development and, if possible, dissemination).

Following the completion of the research and innovation, Renacer hopes that the proposed communication strategy will be implemented in the short term by various actors in the travel and tourism context and that it will be mobilised throughout the seasons and sustained over time.

The main challenge of Renacer will be financing the design of the communicative pieces and the wills of the interested parties who will be in charge of generating the dissemination actions, according to their will and administrative capacity in this regard.

Finally, in order to estimate the needs for the commercialisation of its results, it is expected that during the time of execution of the HEROES project, awareness-raising and training of tourism service providers will be carried out and the participatory design process will be carried out. It is also expected that within this process, companies and stakeholders can be linked to the development of the implementation and dissemination of the strategy, if they decide to generate funding actions.

GI-TOC (Global Initiative) is an independent civil-society organization, headquartered in Geneva, Switzerland, with a globally dispersed Secretariat and a high-level advisory board.

Its network members include prominent law-enforcement, governance and development practitioners who are dedicated to seeking new and innovative strategies and responses to organized crime.

GI-TOC hopes to have an impact in the field of technology and human trafficking.

The needs that could be solved by the results are:

- Highlight need for increased tech expertise among practitioners, amendment to the respective laws

Also, GI-TOC outputs will be:

- Country report for Peru, dissemination on local level

The results will be available through local partners

Regarding the potential users, GI-TOC has identified the following users:

- Peruvian cybercrime unit, national CSOs, law enforcement unit addressing human trafficking

Regarding other technological field that could use their results:

- Tech industry, actors on privacy issues

GI-TOC outlines the main advantages of the new solution(s) it expects:

- Report will induce capacity building for practitioners, (hopefully) lead to law amendments,

The main obstacles to the implementation of any of its results are shown in **Error! Reference source n ot found.** below:

CWCS is a research-based organization and have conducted about 8 studies on trafficking

in women and children in addition to research on child abuse and exploitation and it will

perform the task of research on THB and CSA/CSE in the context of Bangladesh

CWCS hopes to have an impact in the area of Online child sexual exploitation and abuse which has still not been identified or addressed by policy planners due to its clandestine nature, the HEROES project will definitely make an impact when it will be discussed in various meetings with policy makers and initiate advocacy with them to take steps to save the potential victims of cybercrimes.

The need that could be addressed through the results of its tasks is mainly the issue of advocacy for children's rights, especially for abused, exploited, and trafficked children, which remains a low priority issue, although good laws and policies for child protection, advocacy and victim assistance exist but are not adequately implemented. Under Task 5.6, advocacy meetings will be held at policy level with various key stakeholders, highlighting the issue of children's rights, especially for abused, exploited, and trafficked children. In addition, the Red Heart Campaign has been launched to promote children's rights among vulnerable children. This will create awareness raising among the policy planners as well as community people to recognize, identify and assist child victims. Moreover, the issue of online child sexual exploitative have been shared in high level meetings with relevant government officials, UN agencies, development partners and NGOs for making a positive impact.

In addition, CWCS outputs will be:

- Awareness raising educational materials, occasional issue briefs, Red Heart Campaign briefs and badges.
- Promote Child Rights newsletter to document the activities and its outcomes will be prepared to create a social movement to safe children from all forms of exploitation.

Regarding the improvements, CWCS will provide relevant information especially on child sexual abuse/exploitation and trafficking which may feed in information that may improve other tools for example apps to report on online child exploitation and abuse by parents and care givers being developed under the HEROES project.

The results will be available will always be available in both printed and in online social media platforms during and after the project.

Regarding the potential users, CWCS has identified the following users:

- Potential users of their end results especially the awareness and educational materials will be parents, guardians, teachers, social workers, UN agencies, INGOs, NGOs, government agencies and community people.

Regarding other technological field that could use their results:

- The Internet service providers can avail the results for more clarification and to address the issue more effectively.

CWCS outlines the main advantages of the new solution(s) it expects:

- When the results of Task 5.6 will be widely disseminated among policy planners, then it will be taken as a priority issue of the government to address and accordingly measures/steps will be taken to save children from online sexual abuse, exploitation and trafficking which is still not very discussed in government policy level meetings.

Besides, direct results will be publication of Issue briefs for clear understanding, awareness and educational materials, newsletters etc.

Indirect result will be improved safety online for children.

Following the completion of the research and innovation, the research and innovation being initiated by CWCS such as the launching of the Red Heart Campaign to Promote Child Rights of Abused, Exploited and Trafficked Children need to be scaled up and more advocacy at all levels should be undertaken for wide dissemination, acceptance and ownership among both government and non-government actors working with children's issues. Emphasize should be focused on policy makers to take follow-up steps to formulate policies and monitor the measures being formulated by government and non-government agencies. In addition, the expected TRLs of the tool being developed by CWCS will be mainly keeping track through monitoring the end results especially the steps, measures or good practices being undertaken by various stakeholders.

In terms of estimated time to market, their expect 2-3 years to market and realise the vision and mission of the Red Heart Campaign to Promote Child Rights.

Finally, to make CWCS innovation which is the Red Heart Campaign to Promote Child Rights to the global market, they need various types of financial resources namely:

- Data collecting on recent incidents of online child abuse and exploitation to identify the forms and modus operandi etc.
- Accordingly, updating and development of awareness and educational materials
- Identifying the stakeholders who will be use and benefit by the developed materials
- Formulate a market strategy
- Continuous monitoring of end results.

The main obstacles to the implementation of any of its results are shown in Table 4.

Table 4: Tackle the barriers for apply the results (NGOs)

Barriers	Solution
Inadequate financing	- Post-HEROES, apply to other grants and funding to expand tasks develop as part of HEROES. - Will formulate proposals and apply for funding.
Skills shortages	- As a first step, look within the Consortium for support, and then hire third party actors. - Include an element on multi-sectoral coordination in roll-out phase - Attend skill development training.
Regulation that hinders innovation	- Use ICMEC's contacts and expertise to encourage a legislation that protects children more efficiently. - Coordination with all relevant stakeholders. - Will do lobbying for taking in up by policy makers.
Intellectual property right issues	- Letters of Agreements with the concerned party. - Will address it according to the legal framework of the government.
Traditional value chains that are less keen to innovate	- Use different providers and partners - It's primary resource dependent - Will try to motivate community people.
Incompatibility between parts of systems (lack of standards)	- Follow-up project would be necessary. - Will try to convince policy makers to formulate standards.
Mismatch between market needs and the solution.	- Rethink the solution: each of the tasks that they are developing are based on needs, and everything they do is thought with the positive results that need to be achieved and gaps to be fulfilled in mind, for a useful, efficient and sustainable impact. - Coordination with all relevant stakeholders. - Will not arise because it deals with a very sensitive issue i.e. child sexual abuse, exploitation and trafficking which is geared towards the market needs and its immediate solution is a priority issue for all.

- **LEAs (ESMIR, ELAS, SPL, GDCOC, BFPD, PRF):** LEAs are one of the main end-users of HEROES and will use various methodological and technological solutions to fight THB and CSA/CSE crimes. Besides, HEROES will help to achieve each country's security objectives and contribute to better decision-making by policymakers. Furthermore, LEAs will also promote the concept and outcomes of the HEROES project to National and European fora and stakeholders' groups (e.g. EUROPOL, INTERPOL, ENLETS, etc) where they normally and officially participate.

  The main obstacles to the implementation of any of its results are shown in Table 5 below:

Table 5: Tackle the barriers for apply the results (LEAs)

Barriers	Solution
Inadequate financing	- Look for other funding programmes.
Skills shortages	- Binding with skilled partners. - HP Officers possess the skills
Regulation that hinders innovation	- Promoting legislative changes - HP will examine the adjustment with national regulation system.
Intellectual property right issues	- Looking for alternatives
Traditional value chains that are less keen to innovate	- Promote transformation an integration of innovation on those chains. - HP will try to merge traditional and innovative value chains
Incompatibility between parts of systems (lack of standards)	- Higher standardization will be more appreciated than a TRL/SRL higher. - HP will try to resolve incompatibility between parts of systems (creation of standards)
Mismatch between market needs and the solution.	- Engaging into the loop more and better qualified end-users.

- **GOVERNMENT ORGANISATION (SIEE):** Public entity is responsible for the National Intelligence System that will improve the decision-making process of the legislative and executive power to effectively fight organised crime and especially against the THB and CSA/CSE. They will promote the dissemination of the legal and social experiences of HEROES to other countries through cooperation agreements.

6. Conclusions

The outlined Exploitation Plan and strategy provide the basis for helping the consortium to understand and identify the exploitable results, the HEROES value proposition and exploitation activities. In addition, the Exploitation Plan has been created to serve as a framework to ensure the effective and efficient management of the activities for an optimal exploitation and protection of the results produced by the project.

As a living document, it will be updated as results become available to incorporate new exploitation strategies.

The plan will be reviewed particularly at the mid-term review and at the end of the project to evaluate and adapt the current strategy. The final plan will be presented at the M36 of the project and will set out the strategy, as the results will then be known.

During the half of the project, the exploitation and dissemination team will work together to ensure the quality of the promotional material. A second video describing the HEROES project will also be created to generate greater impact and visibility of the HEROES commercial product offer.

The final plan is expected to summarise the impact of the HEROES project on stakeholders and users and target users, but also on the wider community, in the fight against THB and CSA/CSE.

To ensure an optimal exploitation of the project results, the exploitable results have been identified, a roadmap has been established and the exploitable assets of the project have been identified in relation to the different modules of the HEROES project (Prevention, Investigation and Victim Assistance), as well as the vision of the individual exploitation plans of each partner that will lead to new opportunities to generate visibility of the HEROES exploitation results among the relevant stakeholder communities within LEAs and NGOs.

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