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EXCELSIOR Project

H2020-WIDESPREAD-2018-2020 | Grant Agreement No 857510	
Project full title:	**ERATOSTHENES: Excellence Research Centre for Earth Surveillance and Space-Based Monitoring of the Environment**
Project acronym:	**EXCELSIOR**
Work Package:	**WP1 Project Management and Coordination**
Deliverable:	**D1.12 Impact Assessment Methodology**
Version:	**Final D1.12**
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Project acronym:	**EXCELSIOR**
Work Package (WP): Task (T):	**WP1 Project Management and Coordination** **T1.4 Impact Monitoring and Re-assessment**
Deliverable (D):	**D1.12 Impact Assessment Methodology**
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Start date of project:	**1 October 2019** / Duration: **84 months**

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Document Sign-off

Nature	Name	Role	Partner	Date
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APPROVED	All partners			30/03/2020

Work Package 1: Project Management and Coordination

Deliverable D1.12: Impact Assessment Methodology

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EXECUTIVE SUMMARY

This report represents the Impact Assessment Methodology for the project EXCELSIOR project. The primary goal of developing the Impact Assessment methodology is to ensure that the overall and specific objectives of the EXCELSIOR project are achieved. This task undertakes the establishment of a methodology for the yearly monitoring of the impact of the different activities carried out by Eratosthenes Centre of Excellence (ECoE) and its partners through EXCELSIOR against a set of quantified targets. The preliminary list of Key Performance Indicators (KPIs) presented during the proposal stage will need to be defined and a community engagement process to collect the information necessary for the assessment will need to be established (WP 9). The task is responsible for steering project activities to be flexible to adjust the activities in agreement with WP and Task Leaders to ensure the achievement of the Project's strategic objectives. Hence, a Project Management Steering Committee will be established and maintained throughout the EXCELSIOR project to (i) assess the implementation of the work plan and (ii) adjust the activities in agreement with WP and task Leaders to ensure the achievement of the Project's strategic objectives. WP1 provides the KPI monitoring framework and general quality processes, while the WP3 defines concrete actions affecting all other WPs for meeting the Impact KPIs. This task's activities will be coordinated with WP3 activities on strategy definition as a continuous process, in order to update the human resources, infrastructure acquisition and overall work plan and to meet new priorities identified. The analysis outputs will update the Project Action Plan of Task 1.1.

The present document constitutes the first report of the 'Impact Assessment Methodology' in the framework of the EXCELSIOR project, dedicated to Task 1.4 'Impact Monitoring and Re-assessment' under work package WP1 'Project Management and Coordination'. D1.12 is delivered at Month 6 and Month 42. CUT is leading the KPI definition and the re-assessment of the Work Plan with the assistance of the Strategic Partners.

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Abbreviations and Acronyms

BoD	Board of Directors
CA	Consortium Agreement
CUT	Cyprus University of Technology
DCM	Dissemination and Communication Manager
DEC-MTCW	Department of Electronic Communications- Ministry of Transport, Communications and Works
DLR	German Aerospace Center
EAB	External Advisory Board
EC	European Commission
ECoE	ERATOSTHENES Centre of Excellence
EO	Earth Observation
ERC	Eratosthenes Research Centre
GA	Grant Agreement
GDPR	General Data Protection Regulation
IA	Innovation Advisory
IM	Innovation Manager
NEREUS	Network of European Regions Using Space Technologies
NOA	National Observatory of Athens
PAP	Project Action Plan
PC	Project Coordinator
PMSC	Project Management Steering Committee
QM	Quality Assurance Manager
SA	Scientific Advisory
TG	Task Group
TM	Technical Manager
TROPOS	Leibniz Institute for Tropospheric Research
WP	Working Package

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1. INTRODUCTION

The goal of the Impact Assessment Methodology is to develop and implement impact assessment measures and requirements, leading to an agreement for a set of guiding principles that apply to the societal , scientific and economic scrutiny of the proposed development. The Impact assessment (IA) measures if the activities of the EXCELSIOR project have the desired impact. The process involves the identification and characterisation of the most likely impacts of proposed actions (impact prediction/forecasting), and an assessment of the social, science and economic significance of those impacts (impact valuation). The advantages of using matrices to measure impacts is that they provide an easy-to-understand representation across all the impacts. As there are various tools and methodologies to measure impact, it is necessary to focus on which methodologies will be the most effective to measure the EXCELSIOR project.

The impact assessment methodology for planned activities takes into consideration impact magnitude and receptor sensitivity. The Key Performance Indicators (KPI) are the most important measure for the Impact Assessment. KPIs are used to monitor the effectiveness of activities, thereby providing vital information on how to proceed or modify the given activity.

Taking all this into account, this report follows the structure presented below.

Chapter 2 consists of a detailed introduction into impact assessment.

Chapter 3 discusses the various measurement that can be used to assess impact, as well as the KPIs set out for the EXCELSIOR project

Chapter 4 concludes the report.

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2. IMPACT ASSESSMENT

Impact assessment (IA) involves the assessment of short to long-term actions brought about through the development intervention or series of interventions during the phase or project considered. It is a structured process for considering the implications of proposed actions – specifically increased performances - while there is still an opportunity to modify the proposals. IA focuses on change and pathways towards change, rather than on activities or deliverables. IA includes describing activities and potential impacts and determining the nature of impact, the expected magnitude of impact and the sensitivity of receptors. In addition, it considers the potential for project impacts to combine with other impacts associated with existing or planned developments and the potential for project impacts to extend across national boundaries. Key performance indicators (KPIs), which describe how well a project is achieving its objectives, play a key role in this process. They are an indispensable management tool, allowing monitoring of progress, enabling evidence-based decision-making, and aiding in the development of future strategies.

2.1 Metrics for evaluating impacts

The practice of IA relies upon a family of instruments and tools in order to predict future expected consequences of possible decisions. Depending on the level of effort and significance with which the process is undertaken, different degrees of success are achieved. The issuing of a report only to fulfil legal compliance for impact assessment is not typically an effective way of practising IA. Also important to the success of IA is the process of follow-up, which assures that recommendations of the IA are implemented and effective. The appropriate impact metrics can differ significantly, depending on the purpose of the evaluation. IA creates the key dashboard for sustainability; therefore, it is vital to choose an assessment approach that will generate information consistent with its intended use. The goal of IA measurement is to deliver insights to inform strategy and improve program effectiveness (Figure 1).

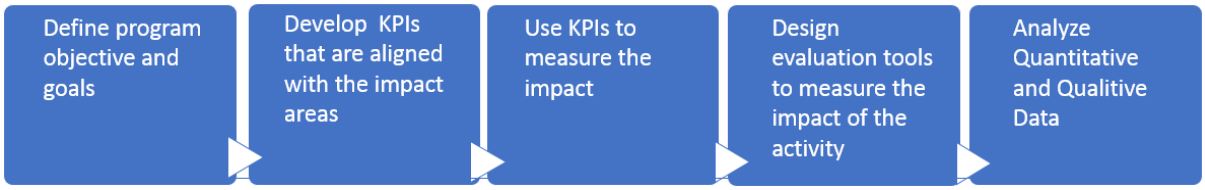

Figure 1: Strategy for measuring impact assessment

2.2 ECoE impacts

The interdisciplinary mixture of the EXELSIOR partners and stakeholders will lead towards the significant upgrade of ERC, which will be established as a CoE in EO and Space-based Monitoring of the Environment, with considerable impacts to Cyprus and the EMMENA region. However, the impacts focus on the future results of the Eratosthenes Centre of Excellence (ECoE). In order to measure these impacts, a longitudinal IA will need to be conducted, that will require at least a decade to show impact and will not be able to be definitively measured. sKey performance indicators (KPIs), which describe

how well a programme is achieving its objectives, play a key role in the evaluation of socio-economic return of the expected impacts of the ECoE.

The impacts of the ECoE are divided into three sections: Economic Impact, Societal Impact and Innovation Impact, as shown in figure 2.

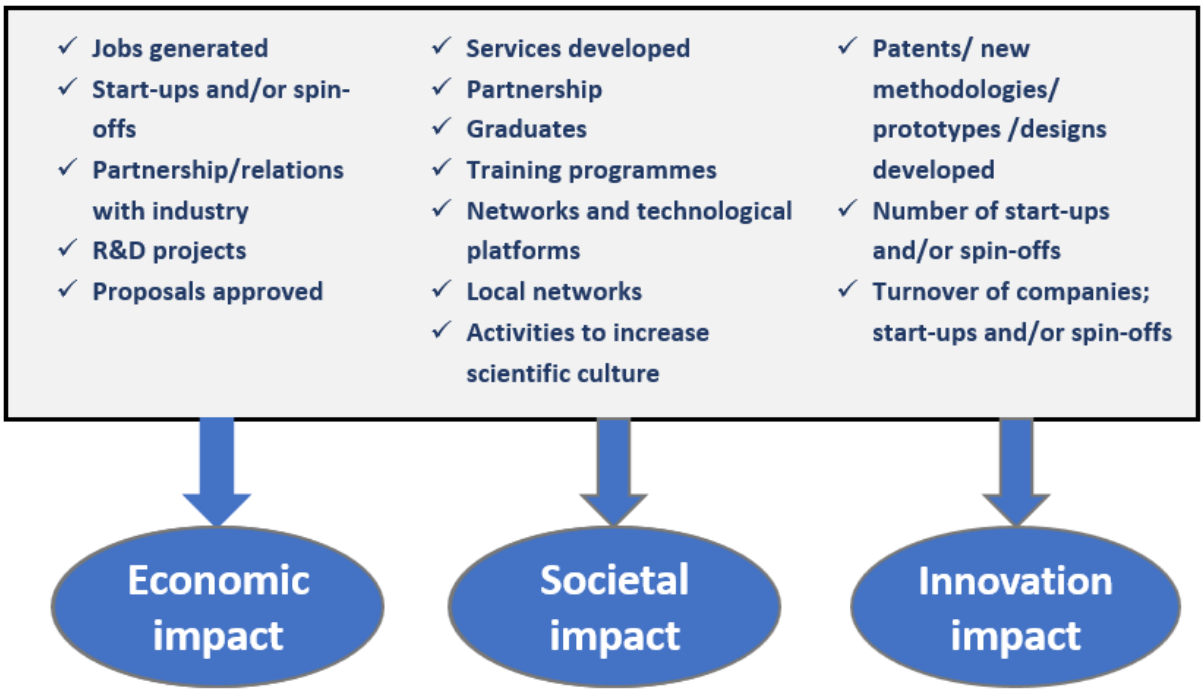

Figure 2: Impact Sectors of the ECoE

Economic Impact: The ECoE will act as a catalyst for investment and job creation. In Cyprus, although the higher education attainment rate is very high, there are a relatively low proportion of graduates in fields most related to innovation. The tertiary attainment rate reached 52.5 % in 2014 and 54.6 % in 2015, which is well above the EU average. However, there is a low proportion of science, technology, engineering and maths graduates, 9.2 per 1000 individuals (age 20-29), below EU average of 19 per 1000 individuals (age 20-29), which may hamper the development of the digital economy.

- The creation of the ECoE, which will incorporate the use of integrated EO information, will increase competitiveness and attract funding with immediate benefit for the economy and employment of the country.
- It will provide employment to up to 60 highly qualified personnel, specialised in the fields of remote sensing and Earth Observation and to up to 50 junior researchers and PhD candidates, thereby providing a significant impact on the local employment.
- Indirect jobs will also be created to service the infrastructure and as a result of increase scientific and economic activity.
- The Entrepreneurship aspect of the ECoE will encourage the development of SMEs through the Incubator Program and through the creation of spin-off and start-up companies.

Societal Impact: The ECoE will also have a societal impact, which will mainly be on public health and quality of life as a result of research on Earth observation.

- The ECoE will provide services and applications for stakeholders to utilise EO data to make informed decisions regarding the health and welfare of their citizens, such as data regarding air quality, dust levels, water management, raw material exploitation, renewable energy, and environmental protection in general.
- The ECoE will conduct research on disasters (natural and/or anthropogenic) and how to minimise the risk to the public as a result.
- Research in smart cities will improve the quality of life for citizens.
- The ECoE will monitor and document cultural heritage sites, thereby providing precise information to stakeholders, which can then be used for conservation efforts.
- Research into the maritime safety and security sector provides information in real time regarding maritime surveillance, thereby minimising the chance of error.

Innovation impact: The EXCELSIOR project will directly address the priorities of the S3Cy (Smart Specialisation Strategy for Cyprus) and is expected to have significant impacts on: Environment, Agriculture and Food Security, Health, Tourism, Energy, Transport, Raw Material and Hydrocarbon Exploitation, Urban Growth and Built Environment. EO techniques will be used to undertake high-calibre research aiming to develop EO innovation, products, as well as solutions and applications that can improve conditions in Cyprus and also the wider EMMENA region.

- The establishment of a data acquisition receiving station in collaboration with DLR and International partners will provide real and quasi real time coverage of environmental and security challenged areas at the cross-roads of three continents.
- The establishment of a ground based remote-sensing station in collaboration with TROPOS will enable real-time and long-term assessment of air quality issues and provide observations of aerosols, clouds, and environmental state. The unique creation of the supersite with continuous observational data incorporated into existing scientific network data bases provides an added value for the National, Regional and European stakeholders for atmospheric and environmental research.
- An Earth Observation Centre of Excellence, located at the most South-eastern part of the European Union, at the gateway of three continents, will also develop to an important hub for European Union space policy and programmes.
- Cyprus, through the ECoE, can play a critical role for demonstration and "trust-building" projects between Europe, Middle-East and North Africa (EMMENA) region.
- The ECoE will be able to provide detailed information regarding the EMMENA region, especially in terms of atmospheric, agricultural, marine, raw material, cultural heritage, energy, border control, water and disaster management data.
- The ECoE, the Strategic Partners and partnering organisations will benefit from the knowledge openness and know-how transfer and the innovation uptake that will take place as a result of collaboration on European and International research projects and services.

2.3 How to maximize impact

To maximise the impact of the EXCELSIOR project, a combination of measures have been defined for implementing efficient dissemination, exploitation and communication plans. Significant channelling

of the ECoE's activity is expected to take place in the context of the needs and priorities of the private sector and educational channels, including seminars, capacity building, trainings-workshops, educational programs, etc. These channels are expected to provide a twofold support in the form of in-kind, financial and/or technical assistance to the ECoE, and will be used as carriers for disseminating the developed innovation and the activities of the ECoE at national level and abroad in the neighbouring countries and regions. Direct channels for contacting stakeholders will include the ECoE website, newsletter, ECoE participation in industry events, direct contact with stakeholders and open workshops. Indirect channels for advertising the ECoE will include partner websites and activities, existing networks established by CSA EU actions in the EMMENA region (e.g. the GEO-CRADLE network of stakeholders), as well as presentations at conferences and seminars. Dissemination cornerstones in EXCELSIOR are the ECoE Knowledge and Networking Hub.

2.4 Challenges

Along with the challenge of defining impact and knowing where to look for change, there are challenges that are common to impact assessment across many agencies. Impact assessments cost a great deal of time and money. Establishing change at the level of individuals and communities can be very difficult and time consuming. If the findings are to be used to shape future development interventions there needs to be a fair degree of certainty about any conclusions and recommendations, which also adds to the cost. In the case of the EXCELSIOR project, economic, societal and innovation impact will require a longitudinal study, which consists of repeated observations of the same variables over long periods of time. Confounding, where extraneous data is present, can also affect the study of the impacts outlined in the EXCELSIOR program. The existence of confounding variables in studies make it difficult to establish a clear causal link between the KPIs and impact. Even where change can be accurately measured or assessed, it can be very challenging to attribute that change to an intervention or set of interventions, since it is impossible to control for all variables that may affect the economic, societal and innovation impact over time.

As a result, the EXCELSIOR project, in anticipation of challenges that may arise, has included tasks in order to insure the validity and effectiveness of the Impact KPIs. In WP1, Task 1.1 focuses on the risk management processes to safeguard that Impact KPIs are met. The KPIs will be re-evaluated and corrective actions will take place if impact for Research, Innovation and Economic KPIs are not met. Figure 3 features the process of how KPIs are implemented and monitored.

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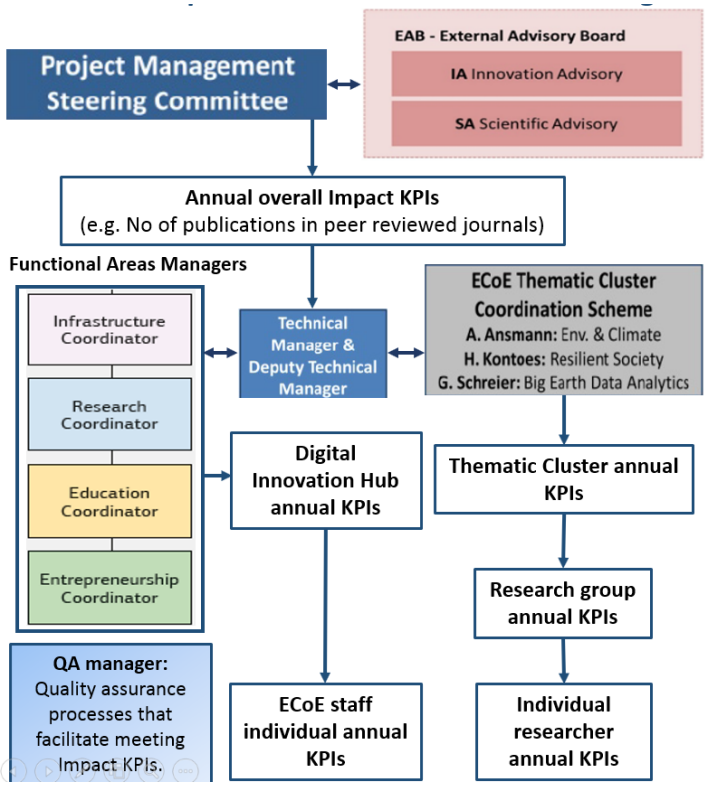

Figure 3: Implementation and monitoring of KPIs

2.5 Key performance indicators

Key Performance Indicators (KPIs) are the critical (key) indicators of progress toward an intended result. They are an indispensable management tool, allowing monitoring of progress, enabling evidence-based decision-making, and aiding in the development of future strategies. As well, they can also significantly contribute to the successful communication of results and achievements, and thus to the financial sustainability of institutions, as well as to increased transparency. KPIs provide a focus for strategic and operational improvement, create an analytical basis for decision making and help focus attention on what is most important. Essentially, KPIs are quantifiable measures used to evaluate the success of an organization in meeting objectives for performance. Once a KPI is defined, methods of measuring and assessing performance need to be defined and carried out in practice. Often, the assessment needs to be broken down into segments, quantified within the desired time frame and are consistently measured and assessed

2.6 Impact assessment framework

Impact assessment reports cover three areas, which are *(1) Impact Framework, (2) Assessment Results and (3) Performance Evaluation.* The Impact Framework is an outlined method for social impact assessment that explains the organization's reasons for measuring impact, the documentation of the impact hypothesis and the mission, vision and goals of the project (figure 4). As well, the framework also examines how impact is measured, what metrics are used, and the tools for collecting data and data management. The assessment results provide data visualization and demonstration for quick

insights. Performance evaluation provides the causality and other contextual support narratives. However, causality is very difficult to verify due to the multi-factor nature of activities. While the last two are necessary for completed evaluative report, the first offers great insights into the impact hypothesis of an organization. Effectively demonstrating this hypothesis alongside a roadmap for data collection for analysis, is impact communication.

In order to define the Impact Framework for the EXCELSIOR project, a Project Management Steering Committee will be established and maintained throughout the EXCELSIOR project to assess the implementation of the impact framework and adjust the activities to ensure the achievement of the Project's strategic objectives. For the EXCELSIOR project, the first step is to define what needs to be evaluated in order to establish KPIs. This will be accomplished by working together with stakeholders to identify what areas need to be targeted. Once the KPIs are established, impact metrics and measurement tools are developed. Although the metrics may be qualitative in nature, the measurements are quantitative. Impact monitoring is then performed in order to track and manage the KPIs and examine if there is any improvement in performance. The last stage of the impact framework is the most important. The measurements for each KPI are evaluated to determine if the target activities across all sectors were impacted. As a result, the KPIs will be reassessed, in order to identify invalid KPIs and establish new KPIs that provide a substantial impact on attaining the goals of the EXCELSIOR project.

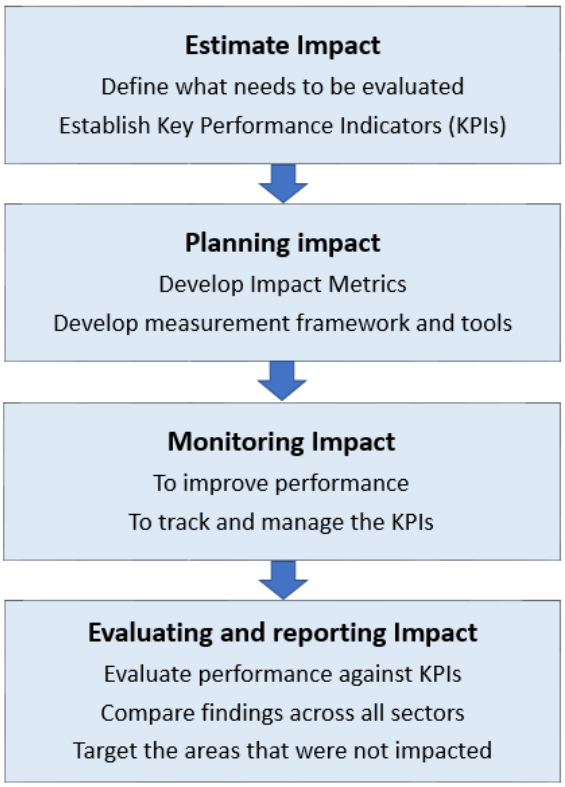

Figure 4: Impact framework

As it is extremely difficult to quantify or qualify the impact that activities will have, impacts can be divided into four different types:

Direct Impact: Impacts that result from a direct interaction between a Project Activity and the receiving environment

Indirect Impact: Impacts that result from other activities that are encouraged to happen because of the Project

Secondary Impact: Impacts that follow on from the primary interactions between the Project and its environment as a result of subsequent interactions within the environment

Cumulative Impact: Impacts that act together with other impacts, from other projects or unrelated activities, to affect the same environmental resource or receptor.

Although direct impacts can be easily measured either quantitatively or qualitatively, the indirect, secondary and cumulative impacts are quite difficult to identify over time, as it is very difficult to identify if the impact was caused from the specific activity. Therefore, the impacts examined in section 3.2 focus on the direct impact of the KPIs established for the EXCELSIOR study.

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3. MEASURING IMPACT

Measuring impact is a practice that requires measurement expertise and a transparent participatory process to ensure that the KPIs used in the IA are valid and reliable. A key concern for measuring impact is to determine what is being assessed and how it can be assessed. Very often, measurement focuses on what is measurable rather than what is important; this is particularly relevant when taking account of the context of each given impact assessment. Another way of looking at impact assessment is to divide initiatives into those looking to measure change, those looking to assess change, and those attempting only to illustrate change. Again, these terms are often used interchangeably. Outcome metrics identify the extent to which an impact meets its goal. They differ from activities and outputs because they are meant to track the results generated from those indicators. Some organizations use outputs to imply impact created rather than diving deeper and using outcome metrics to demonstrate that those outputs have had a positive effect.

3.1 Metrics

By definition, a metric is a standard of measurement which may be qualitative or quantitative. Collecting metrics is only a starting point of a KPI program; however, every metric is not necessarily a KPI. A KPI is a metric that embeds performance targets so organizations can chart progress toward goals. KPIs and metrics can be used to think through what counts as evidence, demonstrating whether impact occurred or not. KPIs provide signals of impact, but do not provide comprehensive assessment of the full range or the many factors that contributed to those impacts. The goal is to use KPIs and metrics as one line of evidence to make better decisions. Quantitative measurement misuse can lead to unintended negative results such as the pressure to publish at all costs or excessive self-citation in research. Using a mix of quantitative and qualitative measures can help understand the 'what' but also the 'how' and 'why' impacts occurred. To avoid such unintended behaviours, indicators and metrics need to be selected responsibly. Namely, it is recommended that a balanced set of indicators and metrics are used to answer the stakeholder assessment questions that focus on their impacts of interest. The advantages of using matrices is that they provide an easy-to-understand visual representation across all the impacts.

3.2 Key performance indicators for the EXCELSIOR project

A holistic KPI portfolio, involving composite and interconnected metrics, helps in leveraging measurements and monitoring ongoing processes for improving multiple facets of the EXCELSIOR project. The Impact Assessment Framework uses KPIs that consider different types of goals. Furthermore, it is critical that the KPIs are aligned with the needs and goals of the stakeholders during the project. A quantitative assessment of the EXCELSIOR project' impact will be made through the definition and monitoring of KPIs. This falls within the scope of the dedicated "Impact Assessment". A Project Management Steering Committee will be established and maintained throughout the EXCELSIOR project to (a) assess the implementation of the work plan, (b) adjust the activities in agreement with WP and task Leaders to ensure the achievement of the Project's strategic objectives and (c) evaluate steering project activities in an effort to be flexible in adapting to changes throughout the seven years duration.

Figure 5 features the KPI cycle, where KPIs are defined based on the ECoE's goals, the external impact of the KPIs and the evaluation of the KPI, at both an internal and external level. The evaluation aspect is vital for the reassessment of the impact resulting from the KPIs. In the evaluation stage, the needs and capabilities of the KPIs can be examined. As well, the KPIs need to be adaptable and reflect technological and societal change.

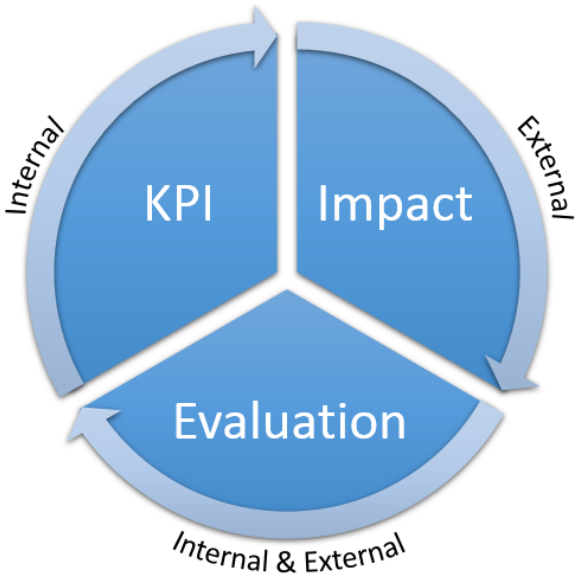

Figure 5: KPI cycle

Table 1 indicates the KPIs for the EXCELSIOR project during the first 4 years of operation. Note that the KPIs are cumulative, i.e., by Year 7 also includes the KPIs from Year 4.

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Table 1: List of Key Performance Indicators

Impact Domain: Research				
Sector: Positioning and Capacities				
Goals	**Key Performance Indicators (KPI)**	**Metric**	**Measure**	
			By YR4 (1-4)	By YR7 (1-7)
The acquisition of all necessary equipment that are essential to conduct cutting-edge research and create applications through a satellite ground receiving centre.	The acquisition of equipment necessary to establish a Centre of Excellence in Cyprus, including a satellite ground receiving station	The purchase of equipment for the operation of a satellite ground receiving station at the Centre of Excellence	Satellite ground receiving station;	Satellite ground receiving station
The acquisition of all necessary equipment that are essential to conduct cutting-edge research and applications through a supersite for aerosol and cloud monitoring.	The acquisition of equipment necessary to establish a Centre of Excellence in Cyprus, including a supersite for aerosol and cloud monitoring	The purchase of equipment for the operation of research facilities of the Centre of Excellence	Supersite for aerosol and cloud monitoring; advanced aerosol polarization /Raman Lidar	Supersite for aerosol and cloud monitoring; advanced aerosol polarization /Raman Lidar;
The acquisition of all necessary equipment that are essential to conduct cutting-edge research and thereby be more competitive in receiving research proposals and creating tailor-made applications for stakeholders.	The acquisition of equipment necessary to establish a Centre of Excellence in Cyprus and utilize equipment that can be used in remote sensing and Earth observation	The purchase of equipment for the operation of research facilities of the Centre of Excellence	Field spectroradiometers and accessories; Aerial, ground and water vehicles; Geodetic equipment; In situ sensors and calibration instruments; IT	Field spectroradiometers and accessories; Aerial, ground and water vehicles; Geodetic equipment; In situ sensors and calibration instruments; IT infrastructure;

			infrastructure; additional equipment in all areas	additional equipment in all areas
The acquisition of numerical models and tools necessary to conduct data analysis	The operation of numerical models and tools	Number of models	1	3
To network with high-level research institutes, which may lead to future research collaborations	The participation within research institute networks	The number of research institute networks that EXCELSIOR will participate with	4	6
To create a world-class Calibration & validation centre at the ECoE and join in monitoring networks that will utilize the calibration and validation centre	The type of equipment that will be calibrated and validated; the capacities of the Calibration/ Validation sector; membership in monitoring networks	Number of Calibration and Validation capacities Membership in Monitoring Networks	1	2
Sector: Human Capital Creation				
Goals	**Key Performance Indicators (KPI)**	**Metric**	**Measure**	
			By YR4 (1-4)	By YR7 (1-7)
To increase the number of Ph.D students registered at the Cyprus University of Technology who are doing their thesis in Earth observation, in cooperation with the ECoE	The number of Ph.D students that are registered each year at the Cyprus University of Technology and are carrying out research at the ECoE.	Number of Ph.D. students registered annually at the Cyprus University of Technology carrying out research at the ECoE	20	50

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To increase the number of students who use the facilities of the ECoE and its Research Institute networks, in order to develop skills and knowledge in EO	The number of students using the Research Institute networks of the ECoE, as well as the facilities of the ECoE, to complete their thesis	Number of students using the RI and facilities of the ECoE for their thesis	80	170
To increase the number of Ph.D graduates who are trained at the ECoE, with the expectation that they will continue conducting research with the ECoE	The number of Ph.D graduates who have been trained at the ECoE in the various sectors of EO	Number of graduates trained on ECoE RI and facilities	30	100
To increase the number of M.Sc./Ph.D foreign students to train at the facilities of the ECoE, thereby encouraging the development of future collaboration.	The number of M.Sc./Ph.D foreign students that are trained at the facilities of the ECoE to increase their EO knowledge and skills	Number of foreign students (Ph.D. / M.Sc.) as % of all students trained on ECoE RI and facilities	10-15%	15-20%
To increase the exchange of ideas, develop knowledge transfer and capacity building, in various sectors of EO	The number of MSC Fellows, European Research Council grants, etc. that will be hosted at the ECoE	Hosting of Researchers (MSC Fellows, European Research Council grants ERC)	MCS=4 ERC=0	MCS=12 ERC =1
To attract high caliber research and technical staff to be employed by the ECoE, thereby avoiding the 'Brain Drain' phenomenon.	The number of research and technical staff that are employed on a full-time basis at the ECoE	Research and technical staff attracted to be employed by ECoE (Full-time equivalent person-years: FTE)	170 FTE	400FTE

To increase the number of high calibre EO researchers and technical staff from abroad, who will be able to contribute to the ECoE through their ability to prepare effective research proposals and engage in applied research	The percentage of research and technical staff who are seeking to work with the ECoE	Percentage of the research and technical staff attracted from abroad	10-20%	15-25%
Sector: Scientific Level				
Goals	**Key Performance Indicators (KPI)**	**Metric**	**Measure**	
			By YR4 (1-4)	By YR7 (1-7)
To be recognized as a high quality Centre of Excellence through the publication of innovative research and applications developed at the ECoE in peer-reviewed journals	Number of articles in peer-reviewed scientific journals which are a result of the research and applications from the ECoE	Record of articles related with research using RI and facilities of the Centre published in peer reviewed scientific journals	80	250
The promotion of the research and application excellence of ECoE, as indicated by the research published in the proceedings of International Conferences	The number of articles resulting from research conducted at the ECoE which is published in the proceedings of International Conferences	Record of articles related with research in ECoE published in proceedings of International Conferences	120	300
To train new EO researchers who are completing their doctoral thesis using the resources of the ECoE, thereby providing high-quality individuals who are specialized in EO	The number of researchers completing their doctoral thesis who have been trained at the ECoE in all aspects of EO	Number of Ph.D. dissertations completed	3	20

To disseminate high quality publications through the ECoE and their collaborations	The number of citations from publications related to the ECoE, which result in a H-Index	H-index of the ECoE group publications	30	45
To increase the number of Citations in SCOPUS, thereby	The number of citations listed in SCOPUS from publications related to the ECoE	Environment and Climate	1500	3000
		Resilient Society	1000	2000
		Big Earth Data Analytics	500	1500
INNOVATION				
Goals	**Key Performance Indicators (KPI)**	**Metric**	**Measure**	
			By YR4 (1-4)	By YR7 (1-7)
The ECoE will establish itself as a centre of innovation by developing new research methodologies and collaborating with industry to create new patents, prototypes and designs in relation to EO in the EMMENA region	The development of EO research methodologies and the number of patents, prototypes and designs developed with industry partners	Number of patents/ new methodologies/prototypes /designs developed	0	3
The ECoE will establish itself as a centre of innovation by supporting start-ups and spin-off companies that are created from the products or knowledge gained from the ECoE research areas	The direct result of the ECoE is measured by the number of EO start-ups and spin-off companies created from the products or knowledge gained from the ECoE research areas	Number of start-ups and/or spin-offs created utilising products or expertise gained from the ECoE Research Areas	0	3
The ECoE will focus on nurturing start-ups and spin-off companies that are directly related to ECoE activities by providing them with	The turnover (profit) of start-ups and spin-off companies that are directly related to ECoE activities is expected to increase	Turnover (Profit) of companies; start-ups and/or spin-offs directly related to ECoE activities	0	€180K

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the necessary resources to enhance productivity and innovation				
Impact Domain: Economic and Societal				
Sector: Societal Impact				
Goals	**Key Performance Indicators (KPI)**	**Metric**	**Measure**	
			By YR4 (1-4)	By YR7 (1-7)
The ECoE will pursue Excellence via the Thematic Networks and Technological platforms addressed by the ECoE, which will lead to enhanced knowledge transfer and the potential for future collaboration	The number of dynamic Thematic Networks and Technological platforms addressed by the ECoE which will lead to future collaboration	Number of Thematic Networks and Technological platforms addressed by the ECoE	8	12
The ECoE will seek out local networks in the field of EO in which both may benefit from the research and innovation of the ECoE	Local networks that will join the ECoE as new members	Local networks addressed for new membership	3	5
The ECoE will focus activities to the local public in order to increase interest in the scientific culture of Cyprus	Activities such as workshops, lectures, television appearances, etc. will be used to increase the interest in science in Cyprus	Activities targeting to non-academic audiences to increase of scientific culture of the country	10	15

The ECoE will develop EO applications and services for the needs of the Government and municipalities, based on the needs of each group	Development of services designed for the Government and the local municipalities using EO.	Services developed for needs of Public Administration on the level of municipality,	5	12
The ECoE will conduct specialized training to teachers, students and professionals in order to provide know-how in EO activities	Educational and professional EO trainings to teachers, students and professionals	Number of Educational and professional training programmes for Teachers/ Students/ professionals	4	8
The ECoE will establish firm partnerships with public authorities, such as municipalities, community organizations and non-government organizations to develop EO applications or share know-how based on the user's need	Establishing partnerships with public authorities in order to develop EO applications and provide information on the applicability of EO data	Partnership with public authorities - Number of municipalities, community councils and Non-Governmental organisations	10	30
One of the main goals of the ECoE is to partner with the various Government agencies, including Ministries, Departments, Government organizations, etc. in order to provide them with EO data and effective applications based on EO observations and research.	Establishing strong partnerships with various agencies of the Government of Cyprus, including Ministries, Departments, Government organizations, etc. in order to provide EO data and applications	Partnership with Government (Number of ministries, Departments, Governmental organisations)	5	10
Sector: Direct economic growth				

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Goals	Key Performance Indicators (KPI)	Metric	Measure	
			By YR4 (1-4)	By YR7 (1-7)
The ECoE will be a vehicle for economic growth, resulting from the hiring of qualified early and experienced researchers, administrative staff, and jobs directly generated from start-ups/spin-offs associated with research activities of ECoE.	The creation of full time jobs for early and late stage researchers, as well as the jobs generated by start-ups/spin-offs associated with research activities of ECoE	Jobs directly generated by ECoE or start-ups/spin-offs associated with research activities of ECoE (in full-time equivalent (FTE) person-years for early stage researchers [ESR] and experienced researchers [EXP])	ESR=47FTE EXP=48FTE	ESR=145FTE EXP=112FTE
The ECoE will encourage the hiring of qualified experts in the EO field. It is expected that the number of Senior Researchers will increase as the ECoE expands, thus leading to increased Excellence in EO, resulting in successful grant applications	An increase in senior researchers will facilitate the number of successful grant applications	Positions for Senior Researchers	19	22
The ECoE seeks to increase innovation and industry by supporting start-ups and spin-offs resulting from the experience gained from the ECoE Research Areas	The number of businesses, such as start-ups and spin-offs created as a result of experience gained from the ECoE Research Areas	Number of start-ups and/or spin-offs created utilising products or expertise gained from the ECoE Research Areas	0	3
The ECoE will establish firm partnerships with industry, including companies and SMEs to develop EO applications	Establishing partnerships with industry, including companies and SMEs in order to develop EO applications and provide	ECoE Partnership/relations with industry (Number of companies, SMEs)	10	50

	information on the applicability of EO data			
The ECoE will receive funding for EO research and development products including from the Government, Private companies, Industry and Education for the creation of applications and products using EO data	The total amount of funding resulting from the development of research and development products.	Total volume of funding associated with R&D projects commissioned to the ECoE (on the basis of the source of funding)	€5M	€13M
It is expected that, as a result of hiring highly qualified researchers, there will be an increase of successful proposals submitted for competitive research funding, either from the coordinator or EXCELSIOR partner	The number of successful proposals submitted for competitive research funding is expected to increase over time	Number of ECoE proposals submitted for competitive research funding (coordinator or partner)	180	370

4. CONCLUSIONS

This report establishes a methodology for the yearly monitoring of the impact of the different activities carried out by ECoE and its partners through EXCELSIOR against a set of quantified targets. Aiming to track the various impact categories of the EXCELSIOR project, several Key Performance Indicators (KPI's) have been identified for the activities of EXCELSIOR and the ECoE. The project's impact is measured against the KPI's. The impact monitoring report will be re-assessed every reporting period to determine any changes that are necessary for effective impact monitoring. KPIs need to be defined for the Economic Impact, Social Impact and Innovation Impact clearly and easily measurable. The KPIs established through the EXCELSIOR project will have both direct and indirect impacts. KPIs require effective metrices in order to provide reliable and valid measurements of the impact, as indicated in the list of Key Performance Indicators

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