PHEMAC
EU-MPC NEXUS

PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

PROJECT N°. 1941

PARTICIPATORY HUB FOR EFFECTIVE MAPPING, ACCELERATION AND CAPITALIZATION OF EU-MPC NEXUS BEST PRACTICES

[D1.3] [Promising Identified Solutions, Hindering Factors, and Recommendations for Better Private Sector Involvement]

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PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

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PARTICIPATORY HUB FOR EFFECTIVE MAPPING, ACCELERATION AND CAPITALIZATION OF EU-MPC NEXUS BEST PRACTICES

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Project abstract:
Too often, projects' results remain at scientific level and fail to sufficiently establish a connection between public and private sector due to different hindering factors. To face this challenge, PHEMAC aims to develop and disseminate an interactive platform to profile best practices of previous and ongoing projects and initiatives related to farming system, water and food in MED region. PHEMAC will exploit the legacies of 5TOI_4EWAS (H2020 project) to continue the mapping process and update with new content to identify additional results to be validated and classified in terms of exploitability and market maturity. Once identified results more adapted to commercialization according to PRIMA SRIA priorities, it will be facilitated the connection between researchers and private investors to ensure viable commercialization plans and final impacts on the ground. Such interaction will be supported through a combined strategy aimed to enhance the level of cooperation between research and investors. This will include the setup of an innovation support helpdesk to facilitate successful replication of catalogued and validated best practices in EU-MPC region, together with organized innovation weeks, hackathon events or go2market support activities. The uniqueness feature of PHEMAC relays on its innovative methodological approach, state of the art STI informatics lab with datamining & high-tech analytical tools to support the establishment of the platform with distinctive characteristics and automated interaction-response. PHEMAC relies on the innovation intelligence expertise among consortium, having industry and tech-parks on the driving seat for development. PHEMAC has linkages to most resourceful initiatives in the region (i.e access to largest worldwide digital library of scientific materials, Egyptian Knowledge Bank, 5TOI platform and datasets, Moroccan industry interface platform, The-Next-Society platform, AGORA) where PHEMAC partners played a significant role.

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1. EXECUTIVE SUMMARY

As part of T1.4. Identification of Innovative Solutions towards Implementing SDGs led by RSS, this deliverable was prepared to aid the design and operation of iHUB.

Innovative solutions within projects reported under D1.2 were identified, though deficient information made the full characterization of innovations and their stages impossible within the timeframe of the task.

Various factors preventing the successful implementation of research results were initially deduced from the outputs of the Cairo Innovation Week and include information availability, stakeholder engagement, commercialization, entrepreneurs and Investors, and sustainability. Each of these is further detailed and explored thus building a full map of hurdles.

In order to ensure better private sector engagement and more successful result implementation, specific suggestions and strategies were formulated, often capitalizing on previous experience in EU projects. These suggestions are relevant to the context of PHEMAC and will serve as a guidance to this and future projects seeking to improve private sector engagement and better result implementation.

2. INTRODUCTION

This report is prepared as a deliverable for the PRIMA funded PHEMAC project (D1.3), described in the workplan as a report on promising identified innovation solutions contributing to SDGs, hindering factors for a successful implementation, and recommendations to overcome low involvement of the private sector.

In order to achieve the objective of this deliverable, the authors will first rely on the outcomes of D1.2, the consolidated database, in order to report on identified innovative solutions. Following this, hindering factors for successful implementation will initially rely the outcomes of Cairo Innovation Week, which extensively explored this issue along with detailed classification and prioritized.

Finally, this report will attempt to present recommendations to overcome low involvement of the private sector, again as inspired by the outcomes of the Cairo Innovation Week, as well as capitalizing on the recorded experience gained through other relevant EU funded programs including 5TOI-4EWAS and MARE alongside expert opinion where appropriate thus ensuring contextual relevance.

3. PROMISING IDENTIFIED INNOVATIVE SOLUTIONS CONTRIBUTING TO SDGS AMONG PROJECTS REPORTED IN DELIVERABLE 1.2

Deliverable 1.2 represents a consolidated database available for interactive mapping platform. It takes the form of an extensive table of 90 EU funded projects furnished with information including abstract, relevant outputs, and links to further information resources. Each project was intensively studied in its directly reported data, along with what was mentioned in recorded external resources, in an effort to identify the intended innovation upon which the project is based. It should be noted that this output is limited by the deficiency of available information.

3.1 LIST OF IDENTIFIED INNOVATIONS

Following is a list of innovations identified within D1.2:

Project details	Identified innovative solutions contributing to the SDGs
1-AQUACYCLE **Water efficiency** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Development of 1 participatory GIS to collect inputs from stakeholders on the reuse potential of effluent water. • Implementation of 1 eco-innovative wastewater treatment technology that combines anaerobic digestion, constructed wetlands and solar treatment. The technology would be implemented in 3 locations in 3 different countries. • Development of 1 Mediterranean Wastewater Reuse Community gathering representatives from public authorities, research/educational institutions, international organizations, NGOs and private entities.
2-BEEP **Energy efficiency and renewable energy** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Development of 1 Building Information Model to enhance energy efficiency in buildings. • Formulation of 1 training guide for architecture, energy and construction professionals involved in the refurbishment of buildings. • Implementation of 9 pilot projects for the implementation of Energy Performance Contracting. "More information needed".
3-BERLIN **Energy efficiency and renewable energy** **02-Sep-19 to 01-Sep-22** **ENI CBC MED**	• 8 energy rehabilitation pilot actions to be implemented. The actions bring together photovoltaic, energy storage, smart grid elements, home automation, etc. to achieve a self-sufficient nano-grid. • Integration of 3 technologies in public buildings. "More information needed".
4-CEOMED **Waste management** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Development of 1 specific methodology for the efficient collection, separation, and exploitation of waste from open-air markets. • Installation of 2 pilot anaerobic digesters for organic waste valorization at fruits/vegetable wholesale markets in Amman and Sfax. • Development of 2 new plans for integrated management of waste from open-air markets.
5- CLIMA **Waste management** **15-Sep-19 to 14-Sep-22** **ENI CBC MED**	• Development of 3 Municipal Waste Management Plans in order to reduce the production of waste and increase the reuse of the organic component. • Creation or enhancement of 3 composting sites in Tunisia and Lebanon.
6-Co-Evolve4BG **Integrated coastal zone management** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• 1 integrated analysis of threats and enabling factors for sustainable tourism at Mediterranean level. • Development of 1 toolkit having indicators to analyze the level of sustainability of tourism. • Implementation of 7 pilot actions for developing sustainable tourism in pilot areas.
7-COMMON **Integrated coastal zone management** **03-Sep-19 to 02-Sep-22** **ENI CBC MED**	• Development of 1 ICT platform for sharing methodologies and data on marine litter. • Conducting 10 studies on linkages between marine litter issue and land-based human activities. • Preparation of 4 reports containing legal recommendations and best practices for improving the management of marine litter and governance issues.
8-DECOST **Waste management** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Design of 4 new Integrated Municipal Waste Management Plans. • Creation of 4 composting plants. • Development of 1 smartphone application allowing citizens to monitor their environmental performance in terms of waste sorting and recycling.

	• Development of 1 business plan to foster the long-term economic viability of the recycling system.
9-ESMES **Energy efficiency and renewable energy** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Establishing 5 national energy-efficiency hubs. "More information needed". • Formulation of 5 strategies to support efficient and cost-effective energy mix in school buildings.
10-GreenBuilding **Energy efficiency and renewable energy** **30-Aug-19 to 29-Aug-22** **ENI CBC MED**	• Preparation of 1 manual for building energy refurbishment towards Nearly Zero-Energy Buildings. • Implementation of 3 pilot projects for the energy refurbishment of public buildings in Greece, Tunisia, and Jordan. • Identification and analysis of 7 best practices in the field of building energy refurbishment. • Development of 1 e-tool for monitoring the energy performance of refurbished buildings.
11-Med-EcoSuRe **Energy efficiency and renewable energy** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Design of 6 toolkits of passive solutions for higher education buildings retrofitting. • Development of 6 cross-border strategic plans for university building retrofitting. • Development of 9 energy efficiency retrofitting pilot actions.
12-MED-InA **Waste management** **01-Sep-19 to 01-Aug-22** **ENI CBC MED**	• Development of 3 Integrated Municipal Waste Management Plans including both organic and plastic waste sorting and treatment solutions. • Adoption of new services and equipment for sorting at source, recycling, reusing, and composting at 3000 households. • Setting up 2,400 low-cost equipment and services for sorting at source and implementing decentralized composting "More information needed".
13-MED4EBM **Integrated coastal zone management** **03-Oct-19 to 02-Oct-22** **ENI CBC MED**	• Development of 1 permanent Mediterranean forum on eco-system-based management and integrated coastal zone management tools and methods.
14-MEDISS **Water efficiency** **01-Aug-19 to 31-Jul-22** **ENI CBC MED**	• Development of 1 database on the water supply, water quality, soil composition and crops situation in the target areas. • Implementation of 4 innovative solutions for non-conventional water supply for different irrigation and domestic purposes.
15-MENAWARA **Water efficiency** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Adoption of new low-cost pre- and post-treatment systems in 6 wastewater treatment plants to improve the quality of treated wastewater for agricultural purposes (Imhoff tank, permeable reactive barriers, sand filters, UV, chlorination, etc.). • Using efficient systems (low-cost innovative sprinklers, subsurface drip irrigation) for treatment of wastewater and irrigating 46.5 hectares of land using the treated wastewater. • Development of 1 interactive web platform facilitating access to information related to best practices and legislation on non-conventional water management.
16-NAWAMED **Water efficiency**	• Installation of 8 real scale pilot for greywater/rainwater treatment and reuse including living green walls (vertical vegetation set up on building façades) and

01-Sep-19 to 09-Sep-22 **ENI CBC MED**	constructed wetlands treating flows from a public building, a parking area, and a refugee camp. • Development of 1 Mediterranean Policy Document to foster the inclusion of water demand management and non-conventional water resources measures in national policy frameworks.
17-PROSIM **Water efficiency** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Deployment of efficient and sustainable irrigation systems in 91 hectares of land. • Testing 8 new technologies to demonstrate the potential of treated wastewater, desalination, and mixed water for irrigation. • Launching 4 investment initiatives to upscale mature innovation solutions having the best market potential "more information needed".
18-BESTMEDGRAPE **Agriculture** **01-Sep-19 to 01-Aug-22** **ENI CBC MED**	• Activation of 20 living labs. • Development of 1 cross-border technology platform to support business networking on grape waste exploitation. • Development of 10 products and services for commercialization in the field of grape derivatives.
19-GREENinMED **Energy efficiency and renewable energy** **01-Sep-19 to 01-Aug-22** **ENI CBC MED**	• Creation of 1 cross-border eco-Innovation support center "More information needed".
20-LIVINGAGRO **Agriculture** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Creation of 2 cross-border living laboratories for innovation and technological transfer in agroforestry. • Development of 10 new products/services in the agroforestry sector "More information needed".
21-MAIA-TAQA **ENergy efficiency and renewable energy/ WATER EFFICINCY** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Establishment of 3 Innovation One-stop-shops "More information needed".
22- **FISH MED NET** **FOOD** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Development of 4 new Mediterranean integrated business models for fisheries diversification. • Creation of 6 counseling desks "More information needed".
23-MedSNAIL **FOOD** **01-Sep-19 to 31-Aug-22** **ENI CBC MED**	• Setting up 1 MedSNAIL alliance among small producers, publish authorities and business to promote good, clean, and fair food "More information needed". • Creation of 6 slow-hubs to provide consultancy services to agro-food MSMEs. • Creation of 6 farmers' markets. • Establishment of 1 Euro-Mediterranean "Chef Alliance" "More information needed".
24-ORGANIC ECOSYSTEM **FOOD** **25-Dec-19 to 25-Dec-22** **ENI CBC MED**	• Establishment of 1 organic cross-border network for cooperation, dialogue, knowledge transfer among stakeholders of the organic sector. • Establishment of 1 cross-border lab to facilitate networking among organic producers, researchers, business angels, public authorities, and stakeholders.

25-IMAGE **FOOD** **2016-03-01 to 2020-02-29** **H2020**	• enhancing the usefulness of genetic collections using latest DNA technology and reproductive physiology for collecting, storing, and distributing biological resources. • Developing synergies between ex-situ and in-situ conservation to maximize resources for the future. • Developing procedures for harmonizing gene bank operations and rationalizing collections, Conservation, and reproductive biotechnologies. • Providing a central information system to connect available data on germplasm and genomic collections.
26-WaterWorks2017 **2018-01-01 to 2022-12-31** **H2020**	• pooling financial resources towards the definition and implementation of a co-funded Joint Call (JC) and developing activities to further support the Water JPI strategy and implementation. • Seeking synergies with international research programmes beyond Europe
27-LEAP4FNSSA **FOOD** **2018-11-01 to 2022-10-31** **H2020**	• Establishing a sustainable structure, or 'Platform', for the efficient and coherent implementation of the AU-EU Research and Innovation Partnership. • Running the platform through the development of a new approach to information mapping, text, and data mining.
28-LEAP-AGRI **FOOD** **2016-12-01 to 2021-11-30** **H2020**	• Launching a joint flagship initiative on its chosen priority area, i.e., Food and Nutrition Security and Sustainable Agriculture (FNSSA). • Defining a joint Strategic Research and Innovation Agenda in the FNSSA domain.
29-5TOI_4EWAS **Water, Energy, Agriculture** **2016-05-01 to 2019-04-30** **H2020**	• Establishing a balanced innovation-friendly ecosystem in the Southern Mediterranean Neighborhood (SMN) based on quintuple helix and NEXUS approach. • Allowing synergies among several ongoing initiatives, utilizing the established Think Tanks Network of Science Counselors in the MPC area and the observatory of current initiatives.
30-SIMRA **Agriculture** **2016-04-01 to 2020-03-31** **H2020**	• Co-constructing a novel evaluative toolkit
31-MADFORWATER **Water Treatment** **2016-06-01 to 2020-11-30** **H2020**	• Developing an integrated set of technological and management instruments to enhance wastewater treatment, treated wastewater reuse for irrigation and water efficiency in agriculture. • implementing integrated water management approaches and reducing fertilizer consumption and decreasing energy consumption and CO2 emissions.
32-WaterWorks2015 **Water** **2016-01-01 to 2021-12-31** **H2020**	• Developing transnational and trans-disciplinary research and innovation actions
33-NEXTFOOD **FOOD** **2018-05-01 to 2022-04-30** **H2020**	• Designing and implementing education and training systems to prepare budding or already practicing professionals with needed competencies. • Developing an international accreditation framework for education and training in fields relevant to sustainable agri-food and forestry systems.
34-HYDROUSA **Water**	• Utilizing water from non-conventional sources in water loops • resulting in recovered and marketable products.

2018-07-01 to 2022-12-31 **H2020**	• Water conservations include aquifer storage and sustainable agricultural practices including fertigation. • combining traditional skilled workmanship with modern ICT integration in smart automation systems.
35-FOSC **FOOD** **2019-10-01 to 2024-09-30** **H2020**	• Technology deployment to build sustainable and resilient food value chains influenced by changing food needs and patterns. • Reduce food losses under climate change, to valorize side streams and reduce food waste.
36-SustInAfrica **Agriculture** **2020-09-01 to 2025-08-31** **H2020**	• Developing and deploying a reference framework on best agricultural practices and technologies.
37-AquaticPollutants **Water Treatment** **2020-01-01 to 2024-12-31** **H2020**	• No identified solutions
38-DIVERSify **Agriculture** **2017-04-01 to 2021-03-31** **H2020**	• Providing tacit knowledge & communication. • Employing ecological approach to identify mechanisms & traits for optimized plant teams. • Designing innovative plant teams. • In-field validation & demonstration of plant teams
39-INCREASE **FOOD** **202 to -05-01** **2025-04-30** **H2020**	• Developing user friendly visualization tools for germplasm management. • Adoption of technologies for genotyping and phenotyping combined with the potential of AI focusing on traits of interest for users
41-LANDSUPPORT **Agriculture** **2018-05-01 to 2021-10-31** **H2020**	• Providing a web-based smart geoSpatial Decision Support System. • integration of already existing databases (interoperability) at different scales with the development of high-performance modelling engines simulating agriculture & forestry, land degradation and environmental issues. • validation by remote sensed data will be ensured by a technology at the state of art for the developing environment, high-performing computing, and massive raster data management.
42-GenRes Bridge **Agriculture** **2019-01-01 to 2021-12-31** **H2020**	• Stakeholders engagement through surveys, panels, and networking events to develop approaches and strategies management of crop. • Providing specific section with resources on GenRes Gateway
43-AGENT **Agriculture** **2020-05-01 to 2025-04-30** **H2020**	• Establishing a European (global) crop genomic diversity atlas. • activating currently inaccessible legacy phenotypic data. • establish training population datasets for the genome-wide prediction of untested GenRes accessions. • developing new tools for novel functionality of data access, visualization, and use to be connected and implemented via plugin or web-services. • Providing a coordinated testing network to facilitate stakeholder engagement
44-FarFish **FOOD**	• A collaborative effort of stakeholders to developing practical, achievable, and cost-effective fisheries management tools and advice.

2017-06-01 to 2021-05-31 **H2020**	• Providing a biological, ecological, technological, economic, political, and social analysis of the impacts of EU fisheries to advance knowledge and promote sustainable and profitable exploitation. • developing management tools and models
45-PALE-Blu **FOOD** **2017-06-01 to 2020-11-30** **H2020**	• Launching a Genome Sequence Data Resource for Bluetongue Virus • Increasing the accuracy of BTV-strain distribution maps through a full-genome sequence-analyses, and prevention strategies. • Using reverse genetics technologies and infection/replication studies. • Exploring more effective and cross-serotype subunit-vaccines. • Developing more effective diagnostic systems
46-BiodivClim **Environment** **2019-09-01 to 2024-08-31** **H2020**	• collaborative networking to promote coordinated international research on biodiversity & climate change. • Design & implement two joint calls for research proposals in the field of biodiversity
47-MADFORWATER **Environment** **2016-06-01 to 2020-11-30** **H2020**	• Redundant project-please see project number 31.
48-MedAID **FOOD** **2017-05-01 to 2021-04-30** **H2020**	• stakeholder engagement in the consultation, communication, dissemination, and training WPs ensuring practical orientation of the project and results implementation. • Scrutinizing biological performance to identify and quantify the relevant components to improve Key Performance Indicators. • interdisciplinary consortium of research and industrial partners to carry out R&D and case study activities to close the existing gaps
49-PANTHEON **Agriculture** **2019-11-01 to 2023-10-31** **H2020**	• constant monitoring of plant health focusing on 2 plant species through developing remote sensing coupled with spectroscopy-based approaches. Complementing these approaches with remote or lab microtechnologies, imaging sensing for label-free, fast, and sensitive analysis. • Providing software for monitoring the plant's health and yields
50-FOODLAND **FOOD** **2020-09-01 to 2024-08-31** **H2020**	• creating a network of 14 local Food Hubs that will aggregate relevant actors and serve as injection points for the introduction of innovations. Creating and validating (TRL 5) 12 prototypes for crop and fish farming and food processing systems that will deliver 17 novel food products
51-ACCWA **Environment** **2019-03-01 to 2023-02-28** **H2020**	• Developing remote sensing-based monitoring tools for agriculture and water and management that help risk guidance in a climate change context
52-SALSA **FOOD** **2016-04-01 to 2020-07-31** **H2020**	• Establishing a global Community of Practice and multi-stakeholder learning platform. • Generation of small farm maps for Europe, identification, and analysis of reference regions.
53-AfriCultuReS **FOOD** **2017-11-01 to 2021-10-31** **H2020**	• Implementing an integrated agricultural monitoring and early warning system. • Producing a web tool that will support early decision making for the stakeholders of African food production.

54-Soils4Africa **Agriculture** **2020-06-01 to 2024-05-31** **H2020**	• Stakeholders engagement in defining use cases and indicators. • Establishing the soil information system and develop its technical infrastructure. Developing procedures and tools for the field activities based on the LUCAS methodology.
55-BRESOV **Environment** **2018-05-01 to 2022-04-30** **H2020**	• Exploiting the genetic variation of specific plant species for enhanced productivity, by exploiting up-to-date knowledge of genome structure and function
56-SUPER PV **Energy efficiency and renewable energy** **2018-05-01 to 2022-04-30** **H2020**	• Adopting hybrid approach combining technological innovations and Data Management methods along the PV value chain
57-EMERTOX **Environment** **2018-03-01 to 2022-02-28** **H2020**	• Sampling, and analyzing the producing organisms and their toxins by chemical and biological methods including immunoassays and sensors
58-FASTER **Water** **2018-11-01 to 2021-10-31** **H2020**	• Establishing living lab through summer schools
59-FLOWERED **Waste management** **2016-06-01 to 2019-11-30** **H2020**	• Studying, testing, and implementing defluorination technologies for drinking and irrigation.
60-SustInAfrica **Agriculture** **2020-09-01 to 2025-08-31** **H2020**	• Developing a set of technologies, including a smart platform supporting farmers in decision-making. • Implementation of field trials at target sites, combining traditional knowledge, sustainable strategies and systems, and modern technologies (developed apps/platform). • Exploiting/continuing approaches/technologies for improved productivity/ecosystem services
61-MIDES **Water** **2016-04-01 to 2020-09-30** **H2020**	• Treating wastewater and generate energy to achieve desalination through Microbial Desalination Cells (MDC). Developing the World's largest demonstrator of an innovative and low-energy technology for drinking water production, using MDC technology.
62-EdiCitNet **FOOD** **2018-09-01 to 2023-08-31** **H2020**	• Reintegration of abandoned and deprived urban areas such as community gardens, green roofs, and indoor farming. • implementation of concrete, neo-ecological demonstrations, and pilot projects. • contribution to climate change adaption in the forms of enhanced water regulation, heat and CO2 mitigation, flood risk control, and resilience by the closure of local and regional resource cycles and increase of biodiversity.
63-DEFEND **FOOD** **2018-06-01 to 2023-05-31** **H2020**	• Controlling the growing LSD and ASF epidemics in Europe and neighboring countries by understanding the drivers of LSDV and ASFV emergence, and generating research outputs which underpin novel diagnostic tools and vaccines and authenticate appropriate and rapid responses by decision-makers

64-FARCROSS **Energy efficiency and renewable energy** **2019-10-01 to 2023-09-30** **H2020**	• Connecting major stakeholders of the energy value chain and demonstrating integrated hardware and software solutions to facilitate the "unlocking" of the resources for the cross-border electricity flows and regional cooperation. • Promoting technologies to enhance the exploitation/capacity/efficiency of transmission grid assets. Establishing an innovative regional forecasting platform will be demonstrated for improved prognosis of renewable generation and demand response and a capacity reserves optimization tool will be tested to maximize cross-border flows.
65-EmpowerMed **Environment** **2019-09-01 to 2023-08-31** **H2020**	• Implementing practical measures of energy efficiency and RES to tackle energy poverty and empower households. • Promoting policy solutions among key actors for stimulating • action against energy poverty at local and EU level.
66-FLEXITRANSTORE **Energy efficiency and renewable energy** **2017-11-01 to 2021-10-31** **H2020**	• Enhancing and accelerating the integration of renewables into European energy systems. • Increasing cross border electricity flows across Europe. • Utilizing ICT technologies / control improvements to enhance the flexibility of the energy grid while increasing the utility of the existing infrastructure. • Developing an enhanced market model on an integrated platform, for flexibility services and to support cross border auctioning and trading of energy
67-Bio-Xplore **FOOD** **ENI CBC MED**	• Establishment of 4 bio-exploration centers providing scientific and educational support "More information needed. • Identification of new natural compounds with potential for cosmetics, food, supplements and/or pharmaceuticals industries "More information needed".
68-PROCAMED **Agriculture** **2012 to 2015** **ENI CBC MED**	• No identified solutions.
69-FISHINMED **FOOD** **2011 to 2015** **ENI CBC MED**	• 1 system for the technical support and assistance to small fishing • Communities were set up to diversify activities and strengthen the competitiveness of fishing operators.
70-LOCAL AGENDA 21 **Energy efficiency and renewable energy** **2012 to 2015** **ENI CBC MED**	• Establishment of 4 observatories and made operational on energy and waste management in 3different countries. • Development and endorsement of energy and waste action plans in Jordan, Lebanon, and Italy.
71-MAPMED **Water efficiency** **2011 to 2015** **ENI CBC MED**	• No identified solutions.
72-SWMED **Water efficiency** **2011 to 2015** **ENI CBC MED**	• Development of sustainable water management tailor-made solution database for different settlement typologies to be applied in water policy. • Installation of Sustainable water management demonstration houses "More information needed".
73-MEDOLICO **Water efficiency**	• Development of user-friendly methodological and technical handbooks/guidelines for operators of olive mills "More information needed".

2007 to 2020 **ENI CBC MED**	• Reduction in levels of toxic substances contained in the OMW before and after being disposed into the environment "More information needed".
74-Promoting sustainable groundwater **Water efficiency** **1994 on going** **ENI CBC MED/ CO FUND**	• Creation of a GIS map of hazards and pollution "More information needed".
75-AQUAKNIGHT **Water efficiency** **ENI CBC MED**	• Development of 1 manual of best practices for reducing commercial water losses in the water networks of the Mediterranean area.
76-ENSIAP **Agriculture** **2011 to 2015** **ENI CBC MED**	• Introduction of water-use efficient irrigation systems "More information needed".
77-RELS **ENergy efficiency and renewable energy/ WATER EFFICINCY** **ENI CBC MED**	• Creation of 1 database of best practices in energy renovation "More information needed". • Development of a master plan that can be adapted to different contexts "More information needed".
78-MED-ALGAE **Water efficiency** **ENI CBC MED**	• Production of biodiesel from microalgae "More information needed".
79-BRAMA **Agriculture** **ENI CBC MED**	• Novel methods in risk assessment of botanicals and botanical preparations "More information needed".
80-LACTIMED **Agriculture** **Nov-12 to May-15** **ENI CBC MED**	• Activation of Mediterranean network of dairy clusters. "More information needed"
81-MedDiet **FOOD** **Jan-13 to Jun-15** **ENI CBC MED**	• No identified solutions.
82-MARE NOSTRUM **Water efficiency** **Jan-13 to Dec-15** **ENI CBC MED**	• Definition of 1 toolkit of recommendations on how to improve the implementation of the Protocol on ICZM and the EU Marine Strategy Framework Directive. "More information needed".
83-ACCBAT **climate** **Dec-12 to Dec-15** **ENI CBC MED**	• Implementation of innovative water-use efficient and sustainable drip-irrigation systems, water storage facilities, and best practice production techniques in agriculture. "More information needed".
84-SCOW **Agriculture** **Jan-13 to Dec-15** **ENI CBC MED**	• Development of 1 Integrated and improved waste collection and recycling organic waste system, with small farm composting plants developed in the agricultural holdings situated near tourist areas. • Development of 1 best practices database that includes 14 records with detailed technical and economic information about collection and specially treatment

	systems using different decentralized composting models with good results and functioning.
85-DIDSOLIT-PB ENergy efficiency and renewable energy/ WATER EFFICINCY Dec-12 to Dec-15 ENI CBC MED	• Implementation of 10 solar power applications in 10 selected public buildings, whereby solar power created (260 kWp) and produced (380 MWh) were increased in the selected buildings. • Transfer of Innovative solar technologies, know-how and best practices. "More information needed".
86-FOSTEr in MED ENergy efficiency and renewable energy/ WATER EFFICINCY Dec-12 to Dec-15 ENI CBC MED	• Increased solar power created (260 kWp) and produced (380 MWh) in the selected buildings.
87-MED-SOLAR ENergy efficiency and renewable energy/ WATER EFFICINCY Jan-13 to Jun-15 ENI CBC MED	• Installation of between 500-800 m2 of photovoltaic modules in 3 buildings and 1 industry.
88-MED-DESIRE ENergy efficiency and renewable energy/ WATER EFFICINCY Jan-13 to Dec-15 ENI CBC MED	• A consensus achieved among public and private key stakeholders on the central role of renewable energies for sustainable development and environmental protection. • A co-operation framework established among providers of energy technologies and services in EU Mediterranean Countries and Mediterranean Member Countries (MPC) to foster the development of a sustainable common energy market
89-SHAAMS ENergy efficiency and renewable energy/ WATER EFFICINCY Nov-12 to Nov-15 ENI CBC MED	• Implementation of new solar energy-driven solutions resulting from technology transfer activities and brokerage events. "More information needed".
90-STS-Med ENergy efficiency and renewable energy/ WATER EFFICINCY Nov-12 to Nov-15 ENI CBC MED	• Implementation of 4 demonstrative plants in 4 different countries for a total power of • 400 kW showing the benefits of the Concentrated Solar technologies to 20.000 end users coming from 20 • Mediterranean local communities.

4 FACTORS HINDERING SUCCESSFUL IMPLEMENTATION OF PROJECT RESULTS

As mentioned in the event report for the Cairo Innovation Week, that event proved to be a very successful source of information as well as validation of the methodology we used in implementing PHEMAC despite the sub-optimal virtual setting. Analysis of the outputs of this exercise by ASRT has resulted in a list of most important factors hindering the successful implementation of results under five main headers:

- Information availability
- Stakeholder engagement
- Commercialization
- Entrepreneurs and Investors
- Sustainability

It is self-evident that PHEMAC is generally aligned with addressing these factors. This section will seek to explain and build upon these findings.

4.1 INFORMATION AVAILABILITY

This was understandably identified by participants as a major factor preventing successful implementation of project results. Furthermore, it was long identified by the EU as a major need resulting in an ongoing effort to place key information related to funded projects in a manner that is accessible to the public through various EU managed platforms, as well as ensuring proper communication and dissemination by including these factors in the application and assessment processes.

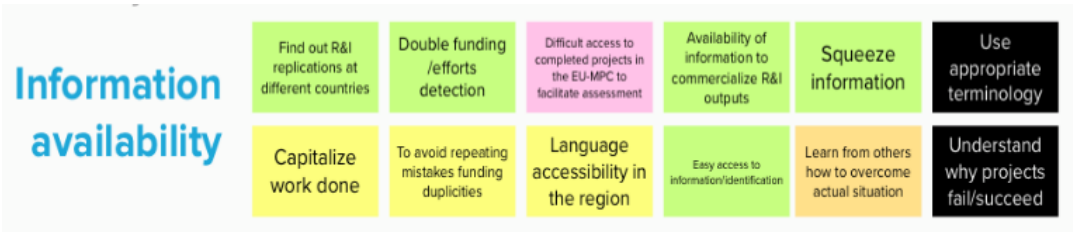

Figure 1 Event Output; Hindering Factors Grouped under "Information Availability"

Closer inspection of the sub-factors that have been grouped under "information availability" reveals some telling factors that fall under two categories which together explain the importance of this factor.

First of all, participants have voiced concerns about the **general availability of detailed information** on implemented and ongoing projects. This was noted by the team preparing this report as noted in the previous section on limitations on the ability to identify innovative solutions contributing to SDGs among projects reported in D1.2. For example, though some entries may mention testing a novel technology as an output, this is not immediately useful for anyone looking for existing technologies and experiences to capitalize. This situation extended to more general information available online where the links provided did not significantly improve the reviewer's ability to identify promising innovations. It is understandable that research results might not always be available for review, especially while projects are ongoing. However, it seems that lack of information availability is less driven by worries regarding intellectual property (IP) protection and more as a passive result of there being no requirement to include detailed results. A balance must be struck between allowing sufficient opacity for researchers and innovators to publish their work in reputable journals or to seek IP rights, and allowing access to key information that results in commercialization, capitalization, or replication.

Secondly, **information that was available was not easily mined** for relevant knowledge due to inherent deficiencies in ways it was recorded onto different databases/platforms/websites, differences in terminologies used, and difficulties in comparing apparently similar projects, among other reasons. Basically, there was no one place those seeking to invest or commercialize could go to for easily accessible potentially valuable project outcomes. A side outcome appears to be instances of double-funding, replication, and loss of funding efficiency due to lack on visibility on the said of funding agencies.

4.2 STAKEHOLDER ENGAGEMENT

In a knowledge economy driven by value creation through innovation, it is clear that effective value capture can only be reliable when multiple stakeholders cooperate to build an effective innovation ecosystem. As such, deficient stakeholder engagement is rightly considered as a critical factor in hindering successful implementation.

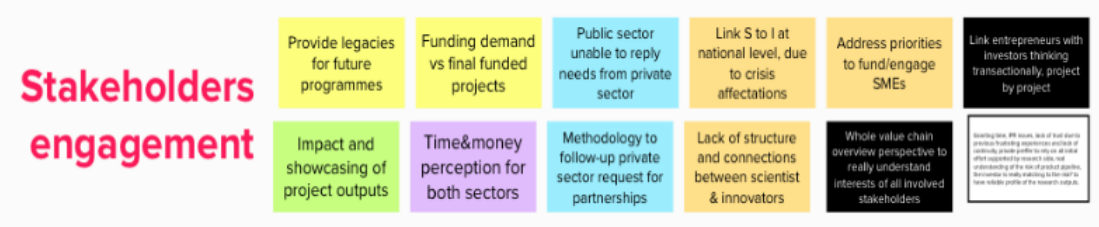

Figure 2 Event Output; Hindering Factors Grouped under "Stakeholder Engagement"

Though the prominence of stakeholder engagement itself is not surprising, what is of further interest is that the various points grouped under stakeholder engagement span the entire project lifecycle. At an early stage, stakeholder engagement is important to avoid the pitfalls of demand matching in projects. In operation, stakeholder engagement is important to grant efficiency and structure while ensuring the best outputs. In advanced stages of project completion, engagement is critical for commercialization and growth including investment and licensing. And finally, after project closure, stakeholder engagement is needed for providing a legacy as well as expanded capitalization.

4.3 COMMERCIALIZATION

Within the context of this exercise, the failure to transform project outputs into commercial products or ventures is seen by participants as a major factor hindering the successful implementation of projects. This perspective is of particular interest as it sees the commercialization activity as starting at an early stage within the research project, and not purely hinging on the latter involvement of industry or investors. Such a reflective, wholistic perspective is the result of the diversity of stakeholders that took part in the exercise.

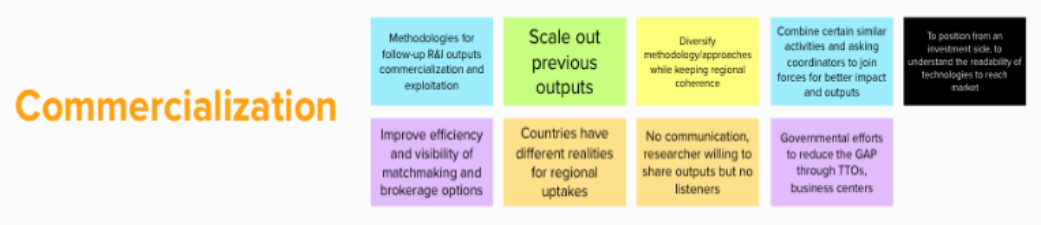

Figure 3 Event Output; Hindering Factors Grouped under "Commercialization"

Further pertinent perspectives lean heavily on the need for expert commercialization support across the board in a manner that echoes active institutional technology transfer, albeit on a multi-program level, while emphasizing the cross-border nature of commercialization support. It appears that further effort must be exerted in this direction in order to ensure successful implementation of project outputs.

4.4 ENTREPRENEURS AND INVESTORS

Of the subgroups that comprise the vast and diverse private sector, entrepreneurs and investors are singled out as a critical subcomponent that is not sufficiently involved, resulting in limited successful implementation. Entrepreneurship is the driving force that turns innovations into successful enterprise, and the risk-taking investors that back them are a determinant factor in any successful ecosystem.

Figure 4 Event Output; Hindering Factors Grouped under "Entrepreneurs and Investors"

Though their importance is self-evident, there is practically no direct linkage between projects, as such, and investors. Projects and consortia do not represent vehicles that can attract or even accept capital injections. Furthermore, investors seeking innovative startups will back the entrepreneur ahead of the venture or even the technology.

4.5 SUSTAINABILITY

Activities and structures that are geared towards ensuring successful implementation of project outputs suffer from being financially non-sustainable, at least in the traditional sense. These activities require significant expert input and management, and largely rely on continuous human capital mobilization. As such, these activities require constant support and there are limited models where they can be operated sustainably on the long-term without continued funding. For example, PHEMAC's online iHub itself is subject to careful planning to ensure it remains in operation after the project concludes.

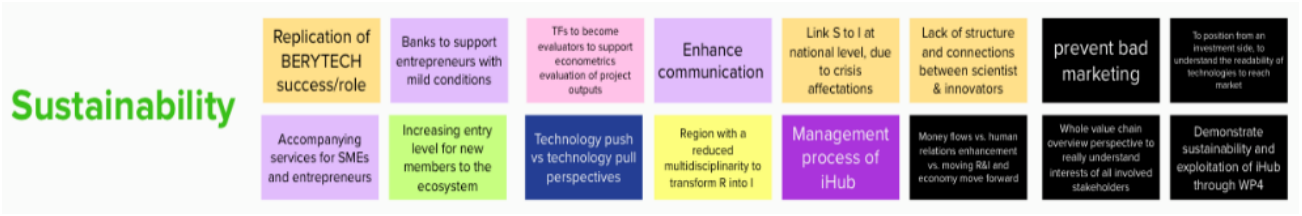

Figure 5 Event Output; Hindering Factors Grouped under "Sustainability"

It seems that the difficulty in ensuring project output sustainability is woven into the structures of typical projects. Projects themselves are planned on a fixed-term basis, and though projects seek sustainability as mandated by the Funding Authorities as part of required project design and assessment, their actual sustainability often appears to hinge on the creation of a spinout or attracting private sector players to take on and replicate project outputs.

5. RECOMMENDATIONS TO OVERCOME THE LOW INVOLVEMENT OF THE PRIVATE SECTOR

Private sector involvement is seen as a determinant factor for the successful implementation of project results. In this final section, rationalized recommendations will be presented to improve private sector involvement in projects and in taking up project outcomes. These recommendations will, once again, lean on the outputs from the Cairo innovation week, which summarized factor importance and implementation feasibility under the "joint actions" header as follows:

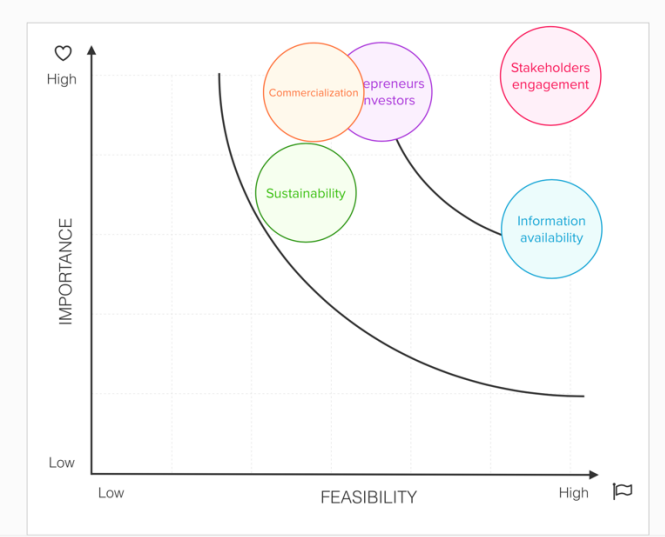

Figure 6 Event Output; Factor Importance and Implementation Feasibility

As such, and taking a generalized approach, improving private sector involvement can be achieved by:

- Improving information availability quantitatively and qualitatively
- Improved stakeholder engagement
- More focused commercialization activities and better commercialization support
- Better involvement of entrepreneurs and investors
- Better long-term project output/outcome sustainability

This report will now focus more on how to deliver each of these private-sector-attracting factors, relying on project outputs, expert opinion, and established knowledge.

5.1 IMPROVING INFORMATION AVAILABILITY QUANTITATIVELY AND QUALITATIVELY

It is notable that the identification of this factor is a validation for the design of PHEMAC as one of its aims is to support the exchange of relevant information between involved actors on programs and policies and to give visibility to natural activities to exchange similar experiences and skills in the region. Therefore, and in addressing this factor, it is most relevant to revisit PHEMAC methodology related to the work packages that together culminate in the interactive platform that is designed for compatible informative use by all stakeholders. In order to achieve this, the project will first conduct focused data gathering and validation followed by analysis, modeling, benchmarking, and other relevant activities, before bringing all this generated knowledge together in an open, capitalizable platform, which is being designed for use by the private sector, among others, to grant more visibility of projects, innovative solutions, and lessons learnt, thus ensuring readily available quality information for all stakeholders including the private sector.

The focus on the upcoming online iHub the PHEMAC methodology also featured prominently in the outputs of the Cairo workshop with the following further suggestions noted:

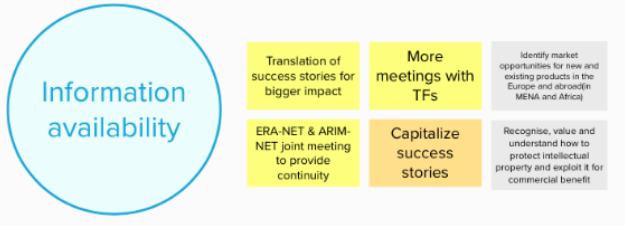

Figure 7 Event Output; specific suggestions related to "Stakeholder Engagement"

5.2 IMPROVED STAKEHOLDER ENGAGEMENT

Beyond passive information availability as described in the previous section, broad and active stakeholder engagement, and in particular the private sector, is seen as a determinant factor for better involvement of the private sector as well as better project outputs and capitalization. Possibly the most advanced form of stakeholder engagement is the quintuple helix model as implemented by the 5TOI-4EWAS model, and that resulted in the participatory creation of a Joint Action Plan among other outputs.

For an innovation ecosystem to function effectively, it is crucial to involve all "components" of the system:

- Policy makers (those that set the framework conditions on which innovation can be developed);
- Innovation supporters (those that support research and development activity);
- Innovation producers (those that invent, build, sell or those able to incorporate the research and development activity);
- Cultural value and the needs and constrain of the civil society (which are defined end-users)
- The natural environments that impacts on the society (socio-ecological aspects)

This is the case of the **Quintuple Helix innovation model framework**, where the natural environments of society and the economy are seen as drivers for knowledge production and innovation, therefore defining opportunities for the knowledge economy. The Quintuple Helix model framework combines knowledge, know-how, and the natural-environment system together into one holistic framework. The complexity of the five-helix structure implies that a full analytical understanding of all helices requires the continuous involvement of the whole disciplinary spectrum, ranging from the natural sciences (because of the natural environment) to the social sciences and humanities (because of society, democracy and the economy). The proposed system can be further improved taking in due consideration the Targeted Open Innovation approach and the strategy proposed by the European Union with the concept of smart specialization.

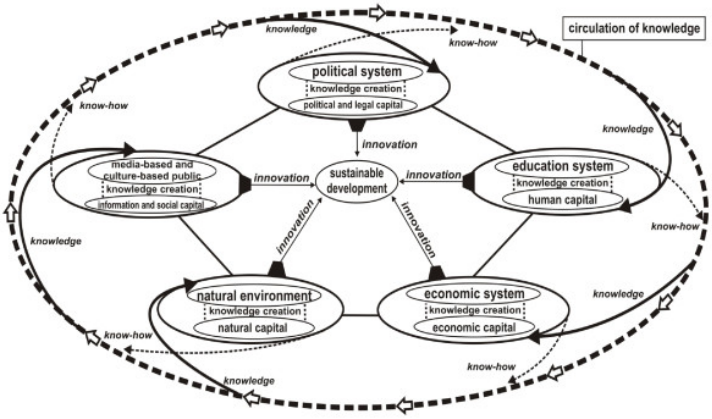

Figure 8 Schematic of the Quintuple Helix Model and its Function

Stakeholder engagement featured prominently in the workshop as a means of ensuring better project, output and outcome quality including replication and dissemination. Further practical points that were highlighted are included in the following graphic:

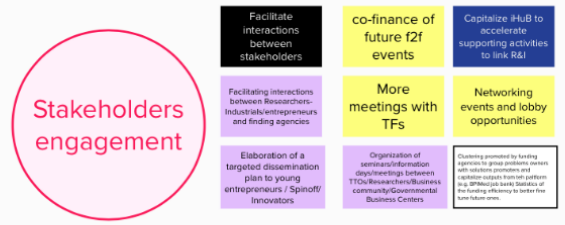

Figure 9 Event Output; specific suggestions related to "Stakeholder Engagement"

5.3 MORE FOCUSED COMMERCIALIZATION ACTIVITIES AND BETTER COMMERCIALIZATION SUPPORT

Transferring research and innovation outputs from their primary non-commercial form into commercial activities through entrepreneurial or licensing tactics remains one of the great problems of scientific research. The persistence of this problem is best exemplified by the 2020 "Research & innovation valorisation channels and tools" report issued by the Directorate-General for Research and Innovation at the European Commission, which opens with a stark statement: "European paradox continues to exist: the Union continues to be a global leader in terms of scientific output producing, for example, 22.7% of all high-quality scientific publications, but still lags behind in translating this advantage into products, services, processes and solutions that meet the demand". This so-called paradox has persisted across decades, frameworks, and billions spent trying to capture the true impact of innovation as social and economic development. Clearly, there remains room for improvement in this critical activity which is a getaway for private sector involvement in successful implementation of results.

In capitalizing the knowledge and models developed in the relevant project The Next Society (ENI funded), where the R2I program sought to achieve just that, it is noteworthy how small activities can place results well on their way to commercialization through simple descriptions and contextual changes without significant initial investment. That activity exemplified the importance of commencing the commercialization effort with a simple contextually relevant description of what is being commercialized, focusing on its value proposition, what might make it attractive to the private sector, as opposed to focusing on technical or administrative details. This approach was primarily implemented in the first section of this report where the authors attempted to concisely and informatively describe a promising innovation in a single meaningful statement. After this initial step is achieved, better information availability (3.1) and better stakeholder engagement (3.2 and 3.4), will allow better commercialization through the private sector.

Beyond this, the Cairo workshop also brought out a few other comments related to commercialization as follows:

Figure 10 Event Output; specific suggestions related to "Commercialization"

5.4 BETTER INVOLVEMENT OF ENTREPRENEURS AND INVESTORS

As mentioned, this is a particularly difficult issue due to the non-conducive structure of funded projects that generally runs contrary to the structure of startups and spinouts both legally and administratively. Nonetheless, there are two major way in which entrepreneurs and investors may be engaged.

First of all, entrepreneurs and startups can be viewed as beneficiaries of project implementation. This approach places this community at the heart of the process, pushing them to innovate and create new outputs that they own, this building a stronger community of entrepreneurs and innovative startups. This is the model followed for the Shamal Start project (Jordan/ ENI funded) which succeeded in graduating large numbers of innovative startups ready to pursue economic activities and engage with the wider community. However, this approach falls short when it comes to bringing entrepreneurs and investors closer to proper engagement with the entire ecosystem such as discussed earlier in the quintuple helix model. For this, it is beneficial to study the NEXLABS model (ENI funded) which also places startups as a beneficiary, but which links them to the knowhow and infrastructure in the wider society including academic institutions through competitive vouchers for various activities such as incubation, analysis, development, etc.

The question of the investor remains slightly more elusive since investors would only follow entrepreneurs. As such, having a vibrant entrepreneurial community may naturally lead to more investor involvement. Nonetheless, meaningful and targeted matchmaking activities between pre-qualified startups that are investment ready with matched investors that are known to be active may be warranted. The key term to note here is meaningful, since it is all too east to collect applications from startups that are not investment ready, or to arrange meetings with investors whose investment criteria is not matched to the startup. A recent example of good practice is the Jordan Entrepreneurship Summit 2020 which was organized virtually as part of the activities of The Next Society (ENI funded). Alongside this event, more than 60 targeted meetings took place between startups and matched investors. Beyond all of this, capacity building for willing and interested researchers and academics that choose to pursue an entrepreneurial career change cannot be neglected as a shortcut towards improving the entrepreneurial nature of projects.

Finally, following are further points raised in the Cairo workshop:

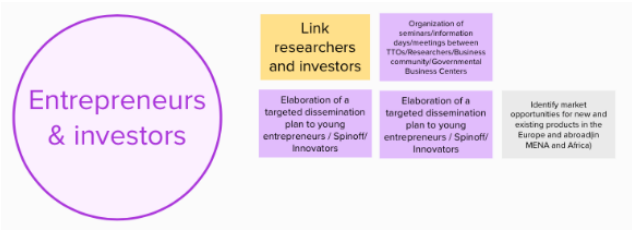

Figure 11 Event Output; specific suggestions related to "Entrepreneurs and Investors"

On a side note, impact investment itself is a noteworthy activity that is geared towards achieving SDGs.

5.5 BETTER LONG-TERM PROJECT OUTPUT/OUTCOME SUSTAINABILITY

The capitalization of support structures that enable successful result implementation as well as active private sector engagement is as critical as it is difficult. This is exemplified by the critical and extensive nature of the iHUB sustainability strategy. Though support activities such as those implemented by PHEMAC in WP3 and WP4 are viewed as critical for capitalization, doing so sustainably after the funding runs out is a challenge. The ENI capitalization call, recently issued, exemplifies the need to place further focus on this.

It appears that there are two credible approaches to this problem. Firstly, treating iHUB, or other similar programs, as a core administrative activity of the EU in the same way that institutions treat technology transfer offices as internal operations. This allows continued funding, albeit at the expense of further model innovation and increased burden of administration. Alternatively, iHUB may develop as an independent commercial entity with its own revenues generated through the

capitalization of developed networks, services, and platforms for the benefit of paying clients. This appears to be a more feasible outcome, though it might carry more long-term financial sustainability risk. An ideal scenario might be a hybrid model where commercial operations are supported through centralized contracts or grants, allowing active private sector tactics while ensuring accurate impact reporting.

Finally, following are further points raised in the Cairo workshop:

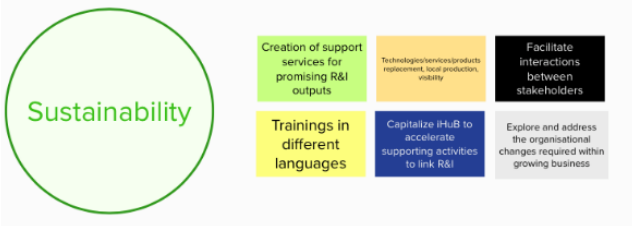

Figure 12 Event Output; specific suggestions related to "Sustainability"

6. CONCLUSION

There appears to be a persistent deficiency related to information as detailed under D1.2, nonetheless, this report managed to implement a commercialization tactic in elaborating the identified innovations in a majority of these projects.

The engagement approached undertaken by ASRT in the PHEMAC Cairo innovation week was particularly useful in generating a high-level map of critical factors, though further expertise was needed to translate these findings into coherent factors and recommendations.

Moving forward, this deliverable will support the design and implementation of iHUB, as well as other activities under PHEMAC.

Nº.	Participant organization name	Acronym	Country
1	UNIVERSITAT AUTÒNOMA DE BARCELONA	UAB	ES
2	ACADEMY OF SCIENTIFIC RESEARCH AND TECHNOLOGY	ASRT	EG
3	INNOLABS	INNOLABS	IT
4	NET 7 SRL	NET7	IT
5	BERYTECH FOUNDATION	BERYTECH	LB
6	CHAMBRE DE COMMERCE ET D INDUSTRIE DU CENTRE	CCIC	TN
7	AMERICAN UNIVERSITY OF BEIRUT	AUB	LB
8	RESEARCH AND TECHNOLOGY CENTER OF ENERGY (CRTEn), ECOPARK BORJ-CEDRIA (TBC)	TBC	TN
9	EGYPTIAN CENTER FOR INNOVATION & TECHNOLOGY DEVELOPMENT	ECITD	EG
10	ROYAL SCIENTIFIC SOCIETY (IPARK)	RSS	JO
11	UNIVERSITÉ SIDI MOHAMED BEN ABDELLAH	USMBA	MO
12	ARTS & MÉTIERS ACCÉLÉRATION	AMA	FR