

EDP4WG1P4 Cluster for marble value chain

Disclaimer – this fiche provides some indications as to which funds could be relevant to ideas identified during the Entrepreneurial Discovery Process in the regions of Eastern Macedonia and Thrace, beyond those provided by the ROP. It is provided to stimulate further the development of the idea. However, it must be intended as exploratory and non-exhaustive.

Title	EDP4WG1P4 Cluster for marble value chain
Short Description	A marble cluster would help across the different elements of the value chain. First, it would help to capitalise the uniqueness of the regional marbles and create/promote a strong regional brand. This would support exports and growth in international markets. The regional brand/cluster could be used to promote the marble tradition in cultural tourism initiatives and to undertake joint R&D efforts to optimise processes and explore new product development. Expected outcomes include more exports, improved profitability as well as more sustainability.
PDL2 Participants	5 WG participants expressed their interest in the idea (3 enterprise, 1 NGO, 1 Government).
Under which TOs of the ROP does this project fall?	The activities within this project fall under TO 3d (Specific Objective 6 “Improve the outward-looking character of SMEs”) of the ROP that explicitly supports collaborative projects or cluster-like schemes to promote export activity of regional enterprises.
Knowledge and actors required	See table 1 in annex
How can ICT, as a key enabling technology, enhance this idea	Clustering is a large- scale intervention. Potentially all identified ICT enablers from table 1 in annex are applicable here.
International dimension	<p>The idea lacks an international dimension, which should be added to ensure business sustainability, access further sources of funds as well as develop both R&D and tourism networks.</p> <p>The following two organisations offer important networking opportunities:</p> <ul style="list-style-type: none"> • European Innovation Partnership on Raw-Materials • Kic on raw materials
Which specific parts of the idea could be funded under H2020?	<p>Within this broadly defined idea, participants explored five activities that could be considered for H2020 funding: (a) Linking regional marble production to traditional uses of marble over the centuries; (b) environmental certification; (c) quarry restoration; (d) establishing a “good practice” label in production and sales and (e) strategic impact.</p> <ul style="list-style-type: none"> • In general, proponents of this idea should follow closely the calls under H2020 societal challenge 12. Climate action, environment, resource efficiency and raw materials • The Horizon2020 Innosup activities, which support the

	<p>development the ecosystem of innovation support to SMEs in Europe may prove relevant to the development of the cluster. In particular:</p> <ul style="list-style-type: none"> ○ Players of the private sector and the academic/research ecosystem/stakeholders should explore INNOSUP-01-2016-2017: Cluster facilitated projects for new industrial value chains ○ Institutional players that implement innovation policies, should explore the opportunities offered by the call: INNOSUP-05-2016-2017: Peer learning of innovation agencies
<i>Which other EU sources of funding could be relevant? For which elements of the project?</i>	To the extent that the Marble cluster would also deal with aspects related to cultural tourism we refer the reader to the fiche on “EDP1WG4P2 - Wine gastronomy - cultural tourism” and on “EDP3WG2P1 Innovative management of cultural heritage”.
<i>Which other national sources of funding could be relevant? For which element of the project?</i>	The regional stakeholders might want to consider extending the geographical coverage of the project activities by collaborating with their peers all over Greece and securing funding under OP Competitiveness, Entrepreneurship and Innovation (TO 3d, Specific Objective 1.5 “Increase the exports of Greek enterprises in the 9 national priority areas”, Materials).
<i>Which other transnational sources of funding could be relevant? For which element of the project?</i>	<p>The Interreg Balkan-Mediterranean in its Priority Axis 1 “Entrepreneurship Innovation” supports the organisation of umbrella associations for SMEs. Proponents of the idea should explore to what extent they could fit under this call.</p> <p>Synergies should be sought in cooperation with Bulgaria, as the Territorial Cooperation Programme between Greece-Bulgaria supports the creation of clusters and SMEs networks under its investment priority 3d (Supporting the capacity of SMEs to grow in regional, national and international markets, and to engage in innovation processes).</p> <p>The multilateral cross-border cooperation "Mediterranean Sea Basin Programme" has – amongst its priorities- to Strengthen and support euro-Mediterranean networks, clusters, consortia and value-chains (priority 1).</p> <p>Furthermore, to the extent that the Marble cluster would also deal with aspects related to cultural tourism we refer the reader to the fiche on “EDP1WG4P2 - Wine gastronomy - cultural tourism” and “EDP3WG2P1 Innovative management of cultural heritage”.</p>
<i>Which other regional sources of funding could be relevant? For which element</i>	Not applicable

<i>of the project?</i>	
<i>Key barriers for the development of the idea</i>	<p>One of the main obstacles for the realization of this project is the cultural resistance to collaboration with other local, national or international actors.</p> <p>The concept of “cluster” needs to be spelled out in more detail. In particular, as several sources of funds available require not only sub-regional collaboration, but national and international one, the cluster-concept needs to be better integrated to international networks in the marble and stone industry.</p> <p>Furthermore, the different scopes of the clusters (R&D, tourism, etc.) need to be clarified and engagement sought with international actors under these different activities.</p>
<i>Steps forward</i>	<ol style="list-style-type: none"> 1. The regional stakeholders in the marble value chain should first commit themselves in working together at the regional level and draft a plan for jointly promoting their products abroad. They should clarify the remit of the cluster (R&D, Innovation, Marketing, Tourism) as well as understand the role they want it to play internationally. 2. Following this reflection, the second step should be financial planning. This would require, among the others, a more in depth understanding of the funding sources available. The option of forming a Greek Marble Cluster (and get funding from OP CEI) should be evaluated in terms of added scope and value versus the regional-only option. Furthermore, the national contact points and managing authorities of the different EU and transnational projects should help assess thoroughly the other opportunities. 3. The third step would be the definition of an implementation plan, in line with the strategic idea of the cluster and the financial resources available.

ANNEX: Table 1. Cross Mapping of Non Metallic Minerals Enterprise and Relevant Knowledge Sectors (Source: C. Emmanouilidis, 2015)

Processes	ICT enablers usage	Supported Function	Benefits / Prospects	Other Knowledge Synergies
Primary				
Quarry Processes	Sensing Technology (machinery sensing, remote sensing) and Monitoring Systems (integrating sensing, data processing and condition assessment) (Francioni et al., 2015, Koruyan et al., 2012) (Abellán et al., 2014)	Quarry / Slopes Risk Monitoring & Assessment (Koruyan et al., 2012, Abellán et al., 2014)	Quarry Performance Enhancement	Physico-Chemical Measurements / Analysis (Aliabdo et al., 2014) (da Fonseca et al., 2013) (Hofmann et al., 2011)
Site Selection - Quarry Design			Improved Sustainability and Environmental Efficiency (Gazi et al., 2012) (Hanieh et al., 2014)	Surveying
Geotechnical Study		Machinery Condition Monitoring	(Henriques and Catarino, 2015) (da Fonseca et al., 2013, Eco-Stone, 2012)	Geology, Geotechnical Engineering & Mining
Drilling / Blasting	Secure Computing and Networking	Environmental Monitoring & Protection (Koruyan et al., 2012, Eco-Stone, 2012)		Stress / Kinematics
Excavation, Loading, Hauling, Dredging	UAV (unmanned aerial vehicles) (Francioni et al., 2015)			Environmental Engineering / Sensing (Eco-Stone, 2012)
Cutting	TLS (terrestrial laser scanning) (Francioni et al., 2015, Abellán et al., 2014)	Quarry Equipment Operation and Maintenance	Risk and Accidents Reduction / Occupational Health Improvement (Ersoya and Yesilkaya, 2014, Abellán et al., 2014)	Sustainable Value Business Mapping / Modelling (Hanieh et al., 2014) (Henriques and Catarino, 2015)
Polishing / Finishing		Performance Monitoring (Eco-Stone, 2012)		
Screening	DTP (digital terrestrial photogrammetry) (Francioni et al., 2015)	Geodata and Geodata-related Services Availability for Improved Planning of Access to Raw Material	Waste Management and Valorisation (Rajgor and Pitroda, 2013)	B2B Business Collaborations
Classification / Separation				Maintenance and Asset Management
Drainage Management	Satellite imaging (Koruyan et al., 2012)	Quarry Data Management and Provenance, supporting Product Traceability and Quality Assurance (Hofmann et al., 2011)	Improved Reliability and Reduced Maintenance Costs	Energy Modelling and Management (Hanieh et al., 2014, Eco-Stone, 2012)
Crushing (Hebhoub et al., 2011) (Aliabdo et al., 2014)	Imaging, Photogrammetry & Laser Scanning support software suites (Francioni et al., 2015, Koruyan et al., 2012, Abellán et al., 2014, Hofmann et al., 2011)			
Environment Protection				
Site Restoration (Simón-Torres et al., 2014)	Geotechnical information systems and Geodata (Francioni et al., 2015)		Product and Product Data Provenance to Business and	
Orders Management	Stress/geological and kinematic	Quarry Stone & Quality		

HR training and management	simulation (Francioni et al., 2015)	Characterisation Support	Customers - Marketing and Quality Assurance Impact	
Other Business Processes	Environmental and sustainability information systems (Hanieh et al., 2014, Eco-Stone, 2012)	H&S Management (Ersoya and Yesilkaya, 2014)	Lean Production	
Site Restoration	Multi-facet data modelling and GIS mapping, including 3D mapping (Francioni et al., 2015)	HR Training (Henriques and Catarino, 2015)	Improved Physical Assets Utilisation	
	Reporting Automation & Quarry Management Information System	Reporting	Improved Resources Utilisation	
	LCA tools (Eco-Stone, 2012)	Lifecycle Management (Eco-Stone, 2012) (Hanieh et al., 2014)		
	CAD/CAE Tools (Eco-Stone, 2012)	On Demand Production		
	Computerised and Mobile Maintenance Management System			
	Tracking and auto-identification technologies (e.g. with RFID sensing). ICT and Automation in Quarry Wastewater Treatment			
<u>Loading and Transportation</u>	Automation in Load Out / Weighing	Cranes / Loading Machinery Monitoring	Load Out Management and Time Reduction	Logistics Supply Chain Management
Load Out	Tracking Automation	Logistics Planning, Tracking and Optimisation	Inventory Reduction	Automation
Weighing	ICT in Logistics and Fleet Management (Inventory and SCM processes) optimization	Supply Chain Optimisation	Shipping Costs Reduction	Optimisation & OR
B2B Processes	B2B Customer Order Management	Inventory Control	Performance Monitoring, Management and Improvement	Education and training (Henriques and Catarino, 2015)
Transportation	ICT-enabled, Augmented Support	HR management/		

	/ Training (Henriques and Catarino, 2015)	technology enhanced training (Henriques and Catarino, 2015)		
	ICT-enabled Product Provenance Support	Loading & Transportation Data Management and Provenance, supporting Product Traceability and Quality Assurance		
Processing				
Unloading & Crane Loading	Sensing Technology for Condition Monitoring	Production Management	Production Performance Improvement	Manufacturing and Production Management
Block / Slabs Cutting	Sensing Technology of Occupational H&S and for Environmental Protection	Maintenance and Operations Management	Enhanced Quality Assurance (Skarlatos and Bakolias, 2010)	Asset and Maintenance Management
Tile /Countertop Cutting, Carving	Tracking Automation and Warehousing	Product Classification and Sorting (Skarlatos and Bakolias, 2010)	Improved Resources Utilisation Enhanced Physical Assets Utilization	Physico-Chemical Measurements / Analysis (Aliabdo et al., 2014) (Rana et al., 2015) (da Fonseca et al., 2013) (Engin, 2013) (Hofmann et al., 2011) (Sounthararajan and Sivakumar, 2013)
CNC / Waterjetting / Sandblasting / Sawing	Imaging for Inspection and Quality Control / Defect Detection / Characterisation (Skarlatos and Bakolias, 2010)	Automation in Handling, Loading, Conveying, Transporting	Improved Health and Safety and Risk Management	Civil Engineering & Architecture
Crushing (Hebhoub et al., 2011) (Aliabdo et al., 2014)	Automation including Imaging for Slab Classification	Inventory Management	Efficient Waste Management (Careddu et al., 2014) (Rana et al., 2015)	Energy Modelling and Management (Hanieh et al., 2014)
Sorting & Packaging	Physico-chemical measurements and analysis data management and decision support (Careddu et al., 2014)	Product Data Provenance and Quality Assurance (Hofmann et al., 2011) (Skarlatos and Bakolias, 2010)	(Eco-Stone, 2012) Enhanced Sustainability and Environmental Protection (Gazi et al., 2012)	Environmental Engineering / Sensing
Shaping / Treating / Aging / Resin Processing (Engin, 2013)	ICT-enabled Product Provenance Support	H&S, Risk Management		
Collecting, Managing and Processing of Powder/Slurry Waste (Hebhoub et al., 2011) (Aliabdo et al., 2014) (André et al., 2014) (Rana et al., 2015) (da Fonseca et al., 2013)	Web-based B2B and B2C functions / orders and purchases	HR management/ technology enhanced training		
	Performance and Energy	Process Planning		

<p>(Rajgor and Pitroda, 2013) (Sounthararajan and Sivakumar, 2013) (Amit and Singh, 2013)</p>	<p>Efficiency Monitoring Systems (Eco-Stone, 2012)</p>	<p>Energy Efficiency (Gazi et al., 2012) (Eco-Stone, 2012)</p>	<p>(Hanieh et al., 2014) (Henriques and Catarino, 2015) (Rana et al., 2015) (Eco-Stone, 2012) (Amit and Singh, 2013)</p>	
	<p>Automation and Monitoring in Waste Crushing</p>			
	<p>Automation in Waste/Slurry Recovery, Disposal and Management/Re-purposing</p>	<p>Environmental Protection and Sustainability (Henriques and Catarino, 2015) (Rana et al., 2015) (Eco-Stone, 2012)</p>	<p>Energy Efficiency (Gazi et al., 2012, Eco-Stone, 2012)</p>	
	<p>ICT-enabled, Augmented/ Mobile Support / Training (Henriques and Catarino, 2015)</p>		<p>Transparency</p>	
	<p>CAD/CAM software for Marble Components Production (Eco-Stone, 2012)</p>	<p>Improved B2B and B2C business chains</p>	<p>Opportunities from Waste Management Business Chains (Amit and Singh, 2013)</p>	
	<p>Software for Process Planning Optimisation</p>	<p>Waste Recovery, Disposal and Management/Re-purposing (André et al., 2014) (Hebhoub et al., 2011)</p>		
	<p>ICT-enabled B2B and B2C product promotion with VR and personalized IT solutions and regional branding support (linkage with heritage / natural resources)</p>	<p>(Aliabdo et al., 2014) (Careddu et al., 2014) (Rana et al., 2015) (Domopoulou et al., 2014) (Sounthararajan and Sivakumar, 2013)</p>		
	<p>Production Line Automation with Software-Supported Optimization</p>	<p>Wastewater Treatment</p>		
		<p>Production Processes Optimisation</p>		
		<p>On Demand Processing</p>		
<p>Retailers, Product End Use & Waste Resources Processing</p>				
<p>Integration of wholesaler-Retailer-End User Chain</p>	<p>ICT B2C / B2B solutions for procurement, aided by Information System and Imaging</p>	<p>End Use Supply Chain Integration</p>	<p>Streamlining B2B and B2C relationships</p>	<p>Civil Engineering & Architecture</p>

Building / Construction Use Energy - Efficient Product Utilisation in Building / Construction Reclaim and recycle construction waste (Uygunoglu et al., 2014)	Repository (includes CBIR)	Web-based Product Preview and e-Procurement	Enhanced Product Personalisation	Business / Management
	Automation and Monitoring in Building / Construction Use	Digital Product Data Integration in End Use Software Suites (e.g. for architecture/building - BIMs, 3D modeling etc).	Improved Efficiency in End-Use Waste Re-cycling / Re-use (Uygunoglu et al., 2014)	Supply Chain Management
	ICT Tools for Re-cycling and Re-use Optimisation	Re-purposing of Waste for other use (e.g. other construction / cement material) (Uygunoglu et al., 2014)		Physico-Chemical Measurements Technology (Aliabdo et al., 2014) (Hofmann et al., 2011) (Domopoulou et al., 2014)
	ICT-supported Logistics in Waste Collection and Management			
	Wireless Networking and Auto-Identification Technology			
	Computer & Networking Security			
Other Processes				
Site Restoration and Re-Use Industrial Heritage & Museums	Augmented Reality / Virtual Reality for experience enhancement	Restored quarries and mills as industrial heritage museums with multiple functions	Value-Adding Tourism Services	Museum Management / Museology
	Mobile Guidance and Content Support	Improved Visit Experience	New Business Opportunities	Industrial Heritage
	Web Store for Bookings and Gifts	Learning Experience	Regional Human Capital Valorisation / Employment	Education and Training
	Multimedia & Narratives Platforms Support			Tourism Management
	ICT-supported Learning		Multi-Use for Functions, Events, etc	
	Miniature Museum Gifts/3D gifts			
	Wireless Networking and Auto-Identification Technology			
	Privacy Preserving / Secure Computing and Networking			