



Greek marble by-products – Limitations and Opportunities

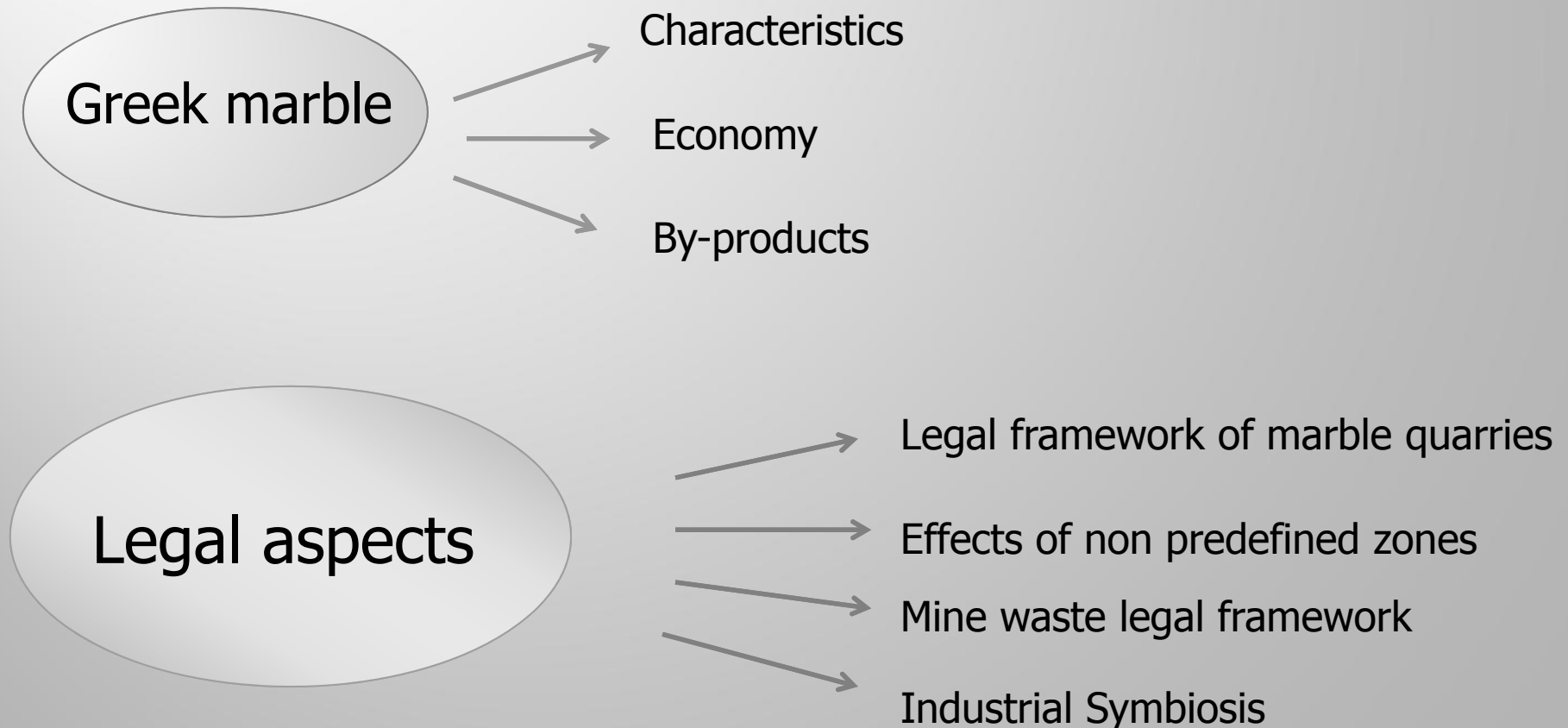
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Aim of the study

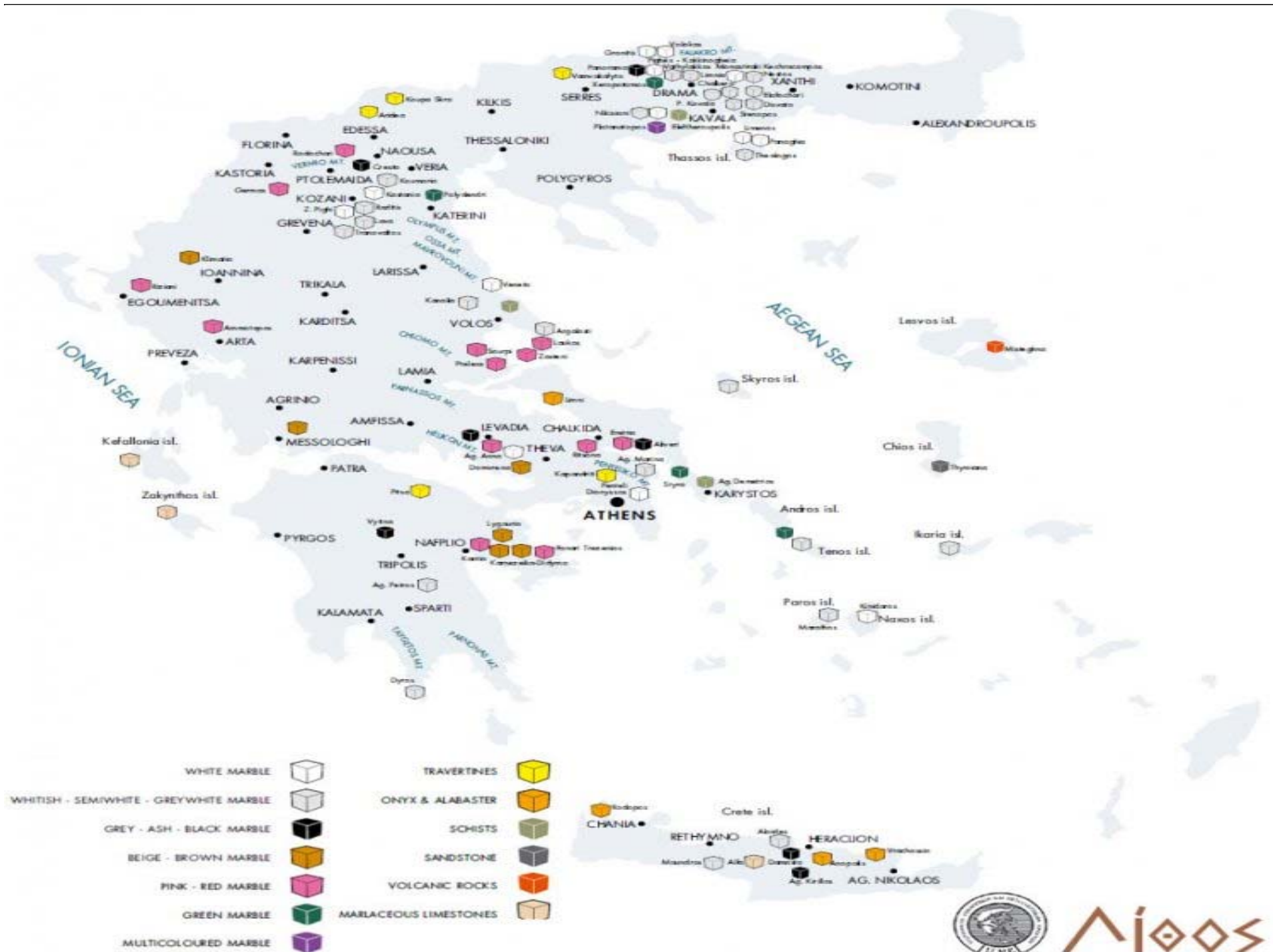
The aim of this study is to identify the administrative and legal problems which prevent the adequate utilization of marble by-products.



Marbles

- Marbles are metamorphic rocks originated from sedimentary carbonate rocks, mainly limestone
- They display a variety of qualities and colours all over Greece





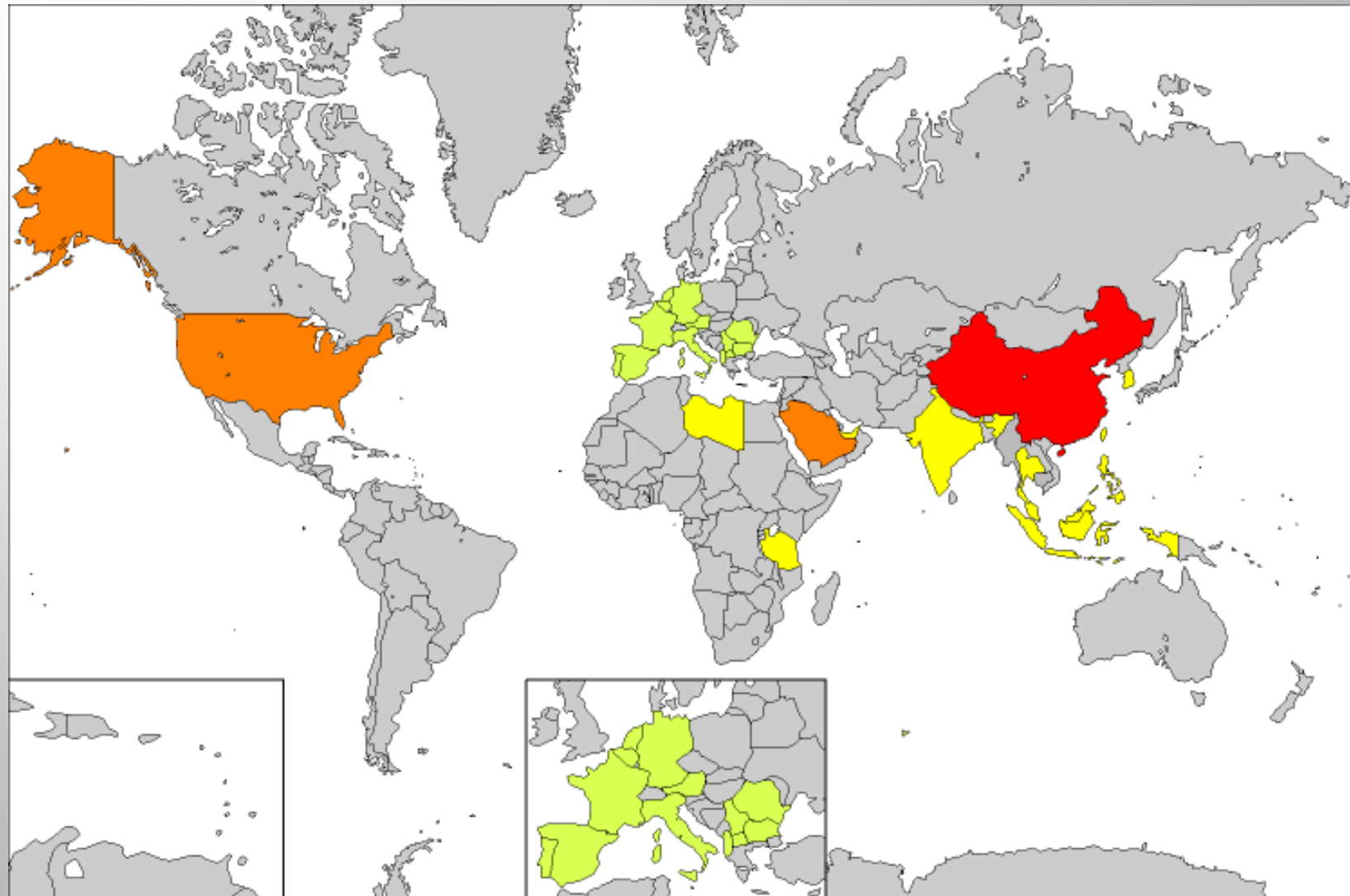
Uses



- Construction Industry
- Sculpting
- Various uses in industry



Marble exports



Financial figures

- 75-80% of the total production is exported
- 40% of the exported material is headed towards China
- 11th globally in decorative stones' production
- In 2013 the exports in the marbles sector were over 850.000 tons and over 240 m. € in value (Hellenic Statistical Agency)
- Rising trend from the start of the financial crisis

Marble by-products

Waste Directive Framework 2008/98/EC defines by-products

Marble by-products



sterile products



marble powder



marble chippings

By-products	Uses
Sterile products	cement, concrete, material 3A
Marble powder	agricultural soil amendment, cement production, desulfurization of flue gas in power stations, production of soda, lime, resin conglomerate for floor, coatings in the building industry, host of chemical applications (cosmetics, pharmaceuticals, feedstuff), filler (production of paper, paint, plastics, rubber, pharmaceuticals, adhesives and waterproof materials, carpet, cables, concrete and coating materials, blast furnace flux and neutralizer for industrial waste acids and heavy metals sorption), decoration
Marble Chippings	cement, concrete, building use, decoration, aquarium decoration

Legal framework of marble quarries

- ▣ Law 669/77: The siting of marble quarries depends on finding or not deposits + No need for mining zones
- ▣ Siting of marble mining areas - zones (Law Draft 2006) not viewed favorably



Effects of non predefined marble zones

- ▣ Flexibility that meets the detection of the deposit
- ▣ Relocation is frequently required in case of land use changing
- ▣ Difficulty on concentration of similar businesses, organization and coordination of mining for the creation of local economies
- ▣ Impossibility of effective quarries restoration in a uniform manner

Effects of non predefined marble zones

Marble quarries scattered in the Greek territory,
in inaccessible areas:

- ❑ Unsustainable firms
- ❑ Impossible cooperation between them
- ❑ Unprofitable by-products, as there is no proximity to the market centers

Mine waste legal framework

- ✓ Article 5 of JMD 39624/2209/E103/200 requires: Waste Management Plan
- 1. Prevention or reduction of waste production and its harmful effects
- 2. Promoting the recovery of extractive waste through recycling, reuse or recovery
- 3. Ensuring safe short and longterm disposal
- ✓ Mining and Quarrying Works Regulation
- ✓ EU Regulation 1907/2006 -REACH

Quarrying enterprises are encouraged to use ecological and sustainable materials so as to be improved on recycling

Mine waste legal framework

- ▣ Article 14 of 669/77 Law: Activity Sheet – old provisions
- ▣ Lack of annual data for marble quarries operations regarding to the disposal and recovery of mining waste
- ▣ Licensed areas are insufficient to place the extracted volume of minerals → waste disposal at off-licensed areas or unnecessarily transportation on the course of quarrying
- ▣ Electronic registration system of Waste Producers Annual Reports has not been completed yet (is provided by Law 4042/2012 for all kinds of waste)

Marble by-products

- ▣ Marble right extents both to by-products and waste (the Article 19 of Law 669/77)



- ▣ Article 3 of Law 4262/14:
 - ✓ By-products of marbles, are freely purchasable from the exploiter
 - ✓ The exploitation of marble has to be the main activity with the highest value among the quarry products that are sold

Industrial Symbiosis Proposal

Industrial Symbiosis :

Targets to a cooperation network between companies in order to achieve optimal utilization of materials, energy and water as well as the expertise exchange

(E- symbiosis, 2015)

Components for IS model

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graph TD; A([Components for IS model]) --> B((Creation of functional systems in a specific location  
↓  
energy saving - reduction of transportation costs)); A --> C((Spatial choices in response to different conditions of each area));
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Creation of functional systems
in a specific location



energy saving - reduction of
transportation costs

Spatial choices in response
to different conditions
of each area

Proposals

- ▣ Legislative framework modification of the quarrying and mining activity for sustainable development
- ▣ Annual compulsory update from the enterprises, concerning the type of mining waste and their disposal route
- ▣ Siting marble mining areas, targeting to a quarry registry, the elaboration inside these zones and their connection with the rest of the business networks
- ▣ Extend of the quarry boundaries

Proposals

- ▣ Accelerating the license procedure and reinforcement of the state supervision
- ▣ Nationwide program for the capabilities of utilizing the marble by-products, depending on its composition and attraction of possibly interested companies
- ▣ Rational design of business networks within the Industrial Symbiosis model for the appropriate utilization of the marble by-products
- ▣ Exploiting domestic ores when carrying public or municipal works out, getting the raw material from nearby quarries, reducing the construction of borrow pits at the same time.

Proposals

- ▣ Reevaluating the tax frame of imports and exports.
- ▣ Utilizing the investment programs.
- ▣ Communication between the institutions and state services, in order to have a common ground of action.

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