

The Iberian industries of natural stone and industrial minerals

A indústria ibérica de rochas ornamentais e minerais industriais

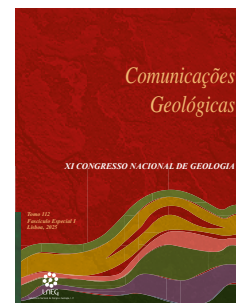
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DOI: <https://doi.org/10.34637/x4a0-n858>

Recebido em 30/09/2023 / Aceite em 20/02/2024

Publicado online em abril de 2025

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Artigo original
Original article

Abstract: After more than two millennia of mining history, Spain and Portugal together produce approximately one billion tons of rocks and industrial minerals each year. In Spain and Portugal, the industry of ornamental rocks and industrial minerals has developed significantly in recent years. The demand for construction and ornamental materials has increased, and both countries have emerged as world leaders in the production of marble and other ornamental products. Despite environmental and competitive challenges, the industry remains profitable and continues to grow steadily.

Keywords: natural stone industry, Industrial minerals, Spain, Portugal.

Resumo: Após mais de dois milénios de história da mineração, Espanha e Portugal produzem juntos cerca de mil milhões de toneladas de rochas e minerais industriais a cada ano. Em Espanha e Portugal, a indústria das rochas ornamentais e minerais industriais desenvolveu-se significativamente nos últimos anos. A procura por materiais de construção e ornamentais aumentou e ambos os países emergiram como líderes mundiais na produção de mármore e outros produtos ornamentais. Apesar dos desafios ambientais e competitivos, a indústria continua lucrativa e em constante crescimento.

Palavras-chave: Rocha ornamental, Minerais Industriais, Espanha, Portugal.

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1. Introduction

The Iberian Peninsula is one of the richest mineral resources areas in Europe, with a mining tradition that goes back to the 13th Century B.C. when the Phoenicians, ventured into the Atlantic and established Cadiz (1240 B.C.). The reason is its complex and diversified geology that provides the peninsula with a considerable mineral potential, leading to the occurrence of significant number of ore, industrial and natural stone deposits, some of them world class. The peninsula holds the Iberian Pyrite Belt (IPB) which is considered the main metallogenic province of the European Union, where occurrences of polymetallic massive sulphide

deposits like Neves-Corvo and Aljustrel, in Portugal, Rio Tinto, Aguas Teñidas, Sotiel, Las Cruces, etc., in Spain. The IPB is the main primary source of base metals in the EU.

The natural stone and industrial mineral industry in Spain and Portugal are growing. Despite the pandemic or the war, both countries remain significant producers and exporters of these materials, and demand is expected to continue to increase in the future. Addressing environmental and competitive challenges will be necessary to ensure a sustainable future for the industry.

The production of dimensional stones has long been an important part of the economy of Spain and Portugal. The Iberian Peninsula has a long history of manufacturing marble, granite, and other beautiful rocks of the highest quality, and in recent years, this industry has experienced substantial growth and innovation. These materials have gained popularity in construction and home decoration, leading to an increased global demand. In Spain, dimension stone production concentrates in the regions of Galicia, Valencia Community, Andalusia, Castille-Leon and Murcia (84%). Portugal, on the other hand, is renowned for its production of high-quality marble and is a significant exporter of dimension stone globally. The marble industry in Portugal has developed in the regions of Estremadura and Alentejo, where there are numerous quarries and factories.

Figures 1 and 2 show the number of dimensional stone resources occurrences in Portugal and Spain in recent years.

Despite the challenges posed by the global pandemic and the resulting uncertainty since its onset, the natural stone sector has exhibited some improvement compared to 2020, with a 12% increase in exports in 2021 (Regueiro and Alonso-Jimenez, 2021). In the global context of recent decades, with increasingly globalized economic relations, the reduction in transport costs and the introduction of new information and communication technologies has meant an increase in trade for the natural stone sector due to external and entry opportunities in new markets, as well as increased competition in domestic markets.

The turnover of the global natural stone market is estimated in 38.805M\$, with an estimated growth term of 5%/year reaching 60.367M\$ in 2030 Allied Market Research, 2022).

In addition to traditional export, there are new international trends, such as:

- Offshoring in all its variants. More and more Spanish and Portuguese companies are adding to the relocation of all or part of the production process, creating subsidiaries in other countries, etc. In many cases, this expansion includes the exploitation of quarries beyond their borders.

- Re-exports and re-imports (the Italian dimensional stone model).
- Tariffs on certain areas are significant in the natural stone industry.
- The foreign trade balance of natural stone in Spain is clearly favourable at €749 million. Until 2020 there had been a drop in both exports and imports, in the context of the global crisis, exacerbated by the COVID19 pandemic. However, this year 2022, it has improved by 9.48% compared to 2020. (Cluster Piedra, 2021).

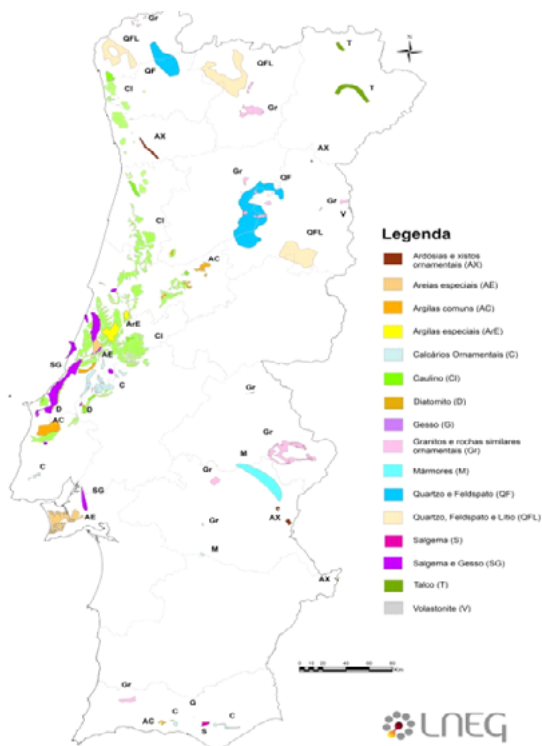


Figure 1. Mineral Resources Occurrences: Continental Portugal: - Non-Metallic resources - Ornamental Stones (LNEG, 2019).

Figura 1. Ocorrências de Recursos Minerais: Portugal Continental: - Recursos não Metálicos - Pedras Ornamentais (LNEG, 2019).

2. Natural stone

The Iberian Peninsula has an extensive history of manufacturing marble, granite, slate and other beautiful stones of the highest quality. These materials have gained popularity in construction and home decoration, leading to an increased global demand. In Spain, natural stone production concentrates in the regions of Galicia, Valencia, Andalusia, Castille-Leon and Murcia (84%) (Marchán Sanz, 2017). Portugal, on the other hand, is renowned for its production of high-quality marble and is a significant exporter of natural stone globally. The marble industry in Portugal has developed in the regions of Estremadura and Alentejo, where there are numerous quarries and factories. Granites can be found scattered all over the country although with a higher density in northern areas such as Viana do Castelo, Braga, Viseu, Porto and Vila Real. In the South granite occurs in Portalegre and Évora districts. Portugal has recently (2017) surpassed Spain in natural stone production in t.

The turnover of the global natural stone market is estimated in 38.805M\$, with some optimistic estimated future growth of 5%/year reaching 60.367M\$ in 2030. But statistics are difficult to obtain thus a real view of the global market is rare. The authors have made efforts to obtain data from various administrations, both Spanish and Portuguese,

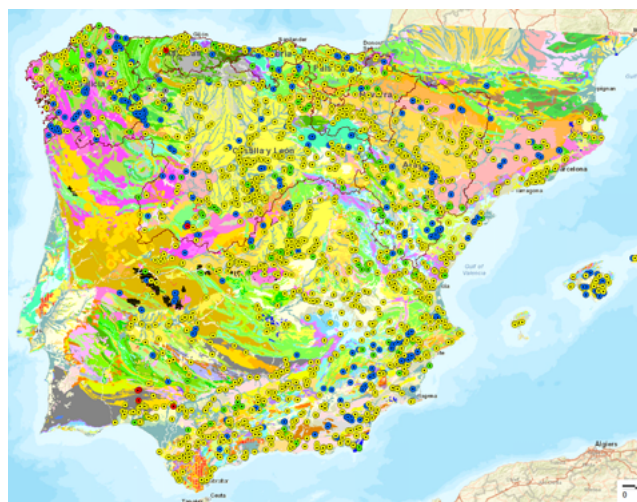


Figure 2. Mineral Resources Occurrences: Spain - Non-Metallic resources - Natural Stones – Metallic resources – Energy resources (IGME, 2020).

Figura 2. Ocorrências de recursos minerais: Espanha - Recursos não metálicos - Pedras naturais - Recursos metálicos - Recursos energéticos (IGME, 2020).

and we have generated results that can be seen in Table 1 and the graphs in Figure 3.

Despite the global pandemic and the uncertainty generated by it since its beginning, the natural stone sector has shown some improvement compared to 2020, increasing exports by 12% in 2021.

In the global context of recent decades, with increasingly globalized economic relations, the reduction in transport costs and the introduction of new information and communication technologies has meant an increase in trade for the natural stone sector due to external and entry opportunities in new markets, as well as increased competition in domestic markets.

Being the most important, foreign trade is not the only manifestation

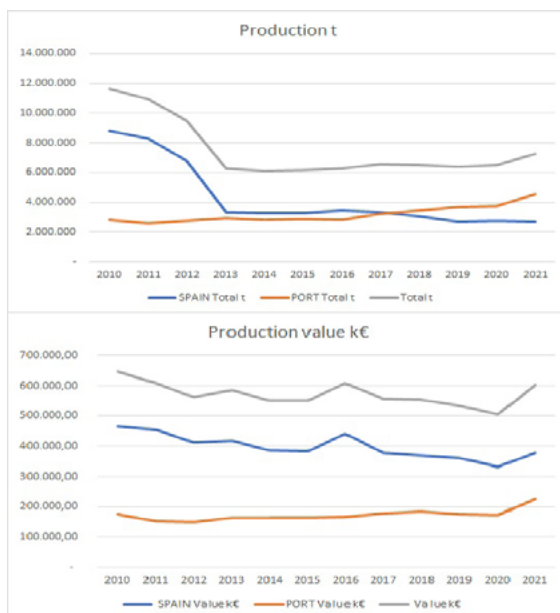


Figure 3. Natural stone production in Spain, Portugal and Iberian Peninsula. Sources: (Ministerio para la Transición Ecológica y el Reto Demográfico., 2023).

Figura 3. Produção de pedra natural em Espanha, Portugal e Península Ibérica. Fontes: (Ministério da Transição Ecológica e do Desafio Demográfico, 2023)

Table 1. Production of Natural Stone in the Iberian Peninsula. Table created by the author using data from (Ministerio para la Transición Ecológica y el Reto Demográfico., 2023) and (Direção Geral de Energia e Geologia Portugal, 2022)

Tabela 1. Produção de Pedra Natural na Península Ibérica. Tabela elaborada pelo autor a partir de dados do (Ministério da Transição Ecológica e do Desafio Demográfico., 2023) e da (Direção Geral de Energia e Geologia Portugal, 2022)

		Marble t	Granite t	Slate t	Paving stone t	Total t	Value 103€
SPAIN	2010	6.298.000	1.525.000	582.000	429.000	8.834.000	469.000
	2011	5.999.000	1.355.000	642.000	304.000	8.300.000	457.000
	2012	4.714.000	1.027.000	666.000	364.000	6.771.000	413.000
	2013	2.080.000	614.000	637.000	38.000	3.369.000	419.000
	2014	1.856.000	655.000	709.000	65.400	3.285.400	386.000
	2015	1.883.000	578.000	778.000	58.000	3.297.000	384.000
	2016	1.828.000	647.000	932.000	47.000	3.454.000	443.000
	2017	1.635.000	677.000	1.019.000	35.000	3.366.000	378.000
	2018	1.418.000	749.000	849.000	25.000	3.041.000	369.000
	2019	1.053.000	719.000	924.000	20.000	2.716.000	360.000
	2020	959.000	707.000	1.087.743	16.000	2.769.743	333.000
2021	941.000	829.000	907.175	21.000	2.698.175	379.000	
PORTUGAL	2010	893.632	1.030.391	18.765	873.943	2.816.731	176.228
	2011	773.336	975.660	24.981	844.356	2.618.332	152.672
	2012	885.101	1.021.571	30.278	806.557	2.743.507	150.593
	2013	999.177	990.264	29.349	899.409	2.918.199	165.831
	2014	820.586	1.152.301	40.130	817.801	2.830.818	165.597
	2015	834.807	1.196.325	48.393	807.550	2.887.076	165.957
	2016	833.751	1.130.661	53.523	792.284	2.810.220	166.879
	2017	972.594	1.400.400	61.905	772.151	3.207.051	179.925
	2018	989.955	1.561.117	66.315	825.251	3.442.639	185.517
	2019	1.266.875	1.431.179	61.974	923.626	3.683.654	175.134
	2020	1.155.604	1.410.677	51.596	1.151.246	3.769.122	171.966
2021	1.927.812	1.643.716	73.451	889.435	4.534.414	223.817	
IBERIAN PENINSULA	2010	7.191.632	2.555.391	600.765	1.302.943	11.650.731	645.228
	2011	6.772.336	2.330.660	666.981	1.148.356	10.918.332	609.672
	2012	5.599.101	2.048.571	696.278	1.170.557	9.514.507	563.593
	2013	3.079.177	1.604.264	666.349	937.409	6.287.199	585.187
	2014	2.676.586	1.807.301	749.130	883.201	6.116.218	551.977
	2015	2.717.807	1.774.325	826.393	865.550	6.184.076	549.957
	2016	2.661.751	1.777.661	985.523	839.284	6.264.220	609.879
	2017	2.607.594	2.077.400	1.080.905	807.151	6.573.051	557.925
	2018	2.407.955	2.310.117	915.315	850.251	6.483.639	554.517
	2019	2.319.875	2.150.179	985.974	943.626	6.399.654	535.134
	2020	2.114.604	2.117.677	1.139.339	1.167.246	6.538.865	504.966
2021	2.868.812	2.472.716	980.626	910.435	7.232.589	602.817	

Table 2. Trends in the production of selected industrial minerals (tx10³) Spain, Portugal and Iberian Peninsula. Sources: (Ministerio para la Transición Ecológica y el Reto Demográfico., 2023).

Tabela 2. Tendências na produção de minerais industriais selecionados (tx10³) Espanha, Portugal e Península Ibérica. Fontes: (Ministério da Transição Ecológica e do Desafio Demográfico, 2023).

Mineral/Year	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019	2.020
Clays	940	2.247	1.430	1.059	1.798	1.519	1.867	1.889	1.875	2.113	1.766
Feldspars	178	196	174	140	140	182	265	243	245	335	321
Kaolin	274	322	322	248	269	252	284	308	374	204	225
Calcium carbonate		1.535	1.553	1.823	1.338	1.365	1.097	1.131	670	1.475	1.262
Common salt	619	631	520	473	70	30	6	8	6	5	4
TOTAL PORTUGAL	2.011	4.932	3.998	3.742	3.616	3.348	3.519	3.579	3.171	4.131	3.577
Clays	3.457	3.568	3.236	3.215	2.720	2.694	2.699	2.727	2.625	2.489	2.221
Feldspars	277	270	213	191	182	169	142	144	150	141	124
Kaolin	1.109	1.111	1.080	1.066	881	858	897	847	822	803	731
Calcium carbonate	6.346	6.280	5.813	5.795	5.486	5.282	5.106	5.054	4.995	4.908	4.597
Common salt	12.870	13.150	12.938	12.510	11.866	11.850	11.508	11.360	11.092	10.489	10.378
TOTAL SPAIN	24.059	24.379	23.280	22.777	21.135	20.853	20.352	20.132	19.684	18.830	18.051
Clays	4.397	5.815	4.666	4.274	4.518	4.213	4.566	4.616	4.500	4.602	3.987
Feldspars	455	466	387	331	322	351	407	387	395	476	445
Kaolin	1.383	1.433	1.402	1.314	1.150	1.110	1.181	1.155	1.196	1.007	956
Calcium carbonate	6.346	7.815	7.366	7.618	6.824	6.647	6.203	6.185	5.665	6.383	5.859
Common salt	13.489	13.781	13.458	12.983	11.936	11.880	11.514	11.368	11.098	10.494	10.382
TOTAL IBERIA	26.070	29.311	27.278	26.519	24.751	24.201	23.871	23.711	22.855	22.961	21.628

of internationalization since it covers any link between companies and foreign markets

However, the dimension stone and industrial mineral industry in Spain and Portugal also faces challenges. Quarrying and mineral extraction can have negative impacts on the environment and local communities, leading to growing concern for sustainability and social responsibility.

Moreover, international competition is also a significant factor in the industry. The presence of dimension stone and industrial mineral producers in emerging countries such as China and India have created strong competition in the global market.

3. Industrial minerals

Industrial minerals are crucial raw materials for a variety of industrial purposes, and Spain and Portugal are significant producers of these resources. Both nations have invested in new technology and diversified their product lines to satisfy changing market demand, which has resulted in tremendous growth and change in the industrial minerals industry in recent years.

In Spain, Catalonia, Andalusia, and Murcia account for most of the country's industrial mineral production. Among other minerals, the nation is a significant producer of feldspar, fluorspar, and kaolin.

In Portugal, the production of industrial minerals concentrates in the Alentejo and Centro regions, where it represents a significant sector of the economy. Along with other minerals, the nation also produces a substantial amount of feldspar and kaolin.

In the case of the Industrial minerals, the National Strategy for Geological Resources in Portugal, launched in 2012, primarily focuses on mining, while also highlighting opportunities for resource efficiency and the comprehensive utilization of mineral resources (Council of Ministers of the Republic of Portugal, 2012) It is worth noting that Portugal has set ambitious targets for reducing greenhouse gas (GHG) emissions, aiming for a reduction between 18% and 23% by 2020 and between 30% and 40% by 2030 (Janikowska and Kulczycka, 2021).

Overall, Spain and Portugal's industrial minerals industry is a substantial economic sector that has undergone tremendous expansion and change in recent years, the Table 3. To be competitive in the global market, both nations have made investments in cutting-edge technologies and environmentally friendly industrial practices.

Over the past 26 years, Spain's exports to Portugal have shown an increase, at an annualized rate of 5.56%, from 7.48M\$ in 1995 to

Table 3. Trends in mining production value (10³€), industrial minerals + natural stone (tx10³) Spain, Portugal and Iberian Peninsula. Sources: (Ministerio para la Transición Ecológica y el Reto Demográfico., 2023)

Tabela 3 Evolução do valor da produção mineira (€10³), minerais industriais + pedra natural (tx10³) Espanha, Portugal e Península Ibérica. Fontes: (Ministério da Transição Ecológica e do Desafio Demográfico, 2023)

Ano	PORTUGAL		ESPAÑA		IBERIA		Total (10 ³ €)
	Minerais Industriais	Rochas Ornamentais	Minerais Industriais	Rochas Ornamentais	Minerais Industriais	Rochas Ornamentais	
2007	57.009	176.197	631.000	710.000	688.009	886.197	1.574.206
2008	50.158	137.427	811.000	636.000	861.158	773.427	1.634.585
2009	43.013	132.632	719.000	487.000	762.013	619.632	1.381.645
2010	57.224	176.228	710.000	469.000	767.224	645.228	1.412.453
2011	55.460	152.672	772.000	457.000	827.460	609.672	1.437.132
2012	45.361	150.593	861.000	413.000	906.361	563.593	1.469.953
2013	45.891	165.831	822.000	419.000	867.891	584.831	1.452.721
2014	46.309	166.460	777.000	386.000	823.309	552.460	1.375.770
2015	45.361	165.957	790.000	384.000	835.361	549.957	1.385.318
2016	46.859	166.879	758.000	443.000	804.859	609.879	1.414.738
2017	59.520	179.925	705.000	378.000	764.520	557.925	1.322.445
2018	59.405	185.517	821.000	369.000	880.405	554.517	1.434.923
2019	54.884	175.134	779.000	360.000	833.884	535.134	1.369.018
2020	55.449	171.966	666.847	333.000	722.295	504.966	1.227.261
2021	86.555	223.817	818.680	394.170	905.235	617.987	1.523.223

30.5M\$ in 2021. In 2021, Portugal exported 19.3M\$ to Spain.

In 2021, Spain’s exports to Portugal amounted to 375.15 M€ (298.59 M€ in 2020). The top five product groups exported were vehicles and other transport materials (15.8% of the total), agricultural products (12.6% of the total), chemicals (12.2% of the total), machinery and appliances (11.5% of the total), and common metals (8.8% of the total). Imports were 407.69 million euros, contrasting with 315.82 million in 2020.

The value of minerals exported to Portugal from Spain was 12,770M€ (3.9% of total) and minerals imported by Spain from Portugal were 10,164.40M€ (2.49% of total).

Globally the trade balance between Portugal and Spain (2021) is positive to Spain

- Portugal -10,157 M€
- Spain: +11,458 M€

4. Conclusions

Spain and Portugal have very close economic relations particularly since the simultaneous integration in the EU. Such close connection means that both countries face the same challenges in a globalized market, this is possible to see in Table 3 and Figure 4.

Spain is Portugal’s main partner in both commercial aspects (import and export), representing in 2020 the source of 32.6% of global merchandise imports and the destination of 25.4% of exports.

Now that the exports of both countries have already returned to pre-pandemic levels their economic ties will be reinforced in the future. Spanish international companies know that Portugal is an excellent

business ecosystem within the European framework and appreciate the proximity, flexibility, quality, and expertise of Portuguese professionals.

In the Natural stone industry, Portugal the 7th World producer and Spain is now the 9th, but together they are the 5th global producer (1,5 Billion €). Portugal has surpassed Spain in global natural stone production (in t) since 2017.

In selected industrial minerals, Portugal has maintained a stable production of 3 Mt/year, whereas Spain show a slight reduction in the period 2010-2020.

The natural stone and industrial minerals market is an excellent example of the existing and potential synergies to develop a real IBERIAN industrial rocks and minerals European and global leader.

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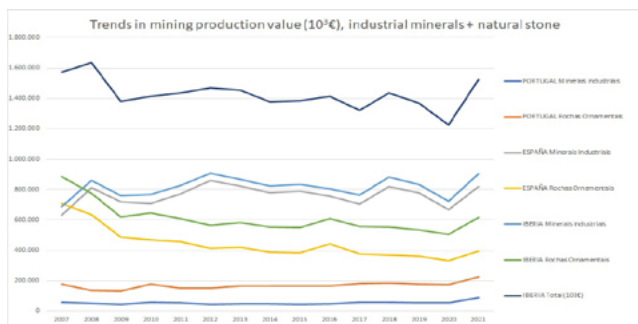


Figure 4. Natural stone production in Spain, Portugal and Iberian Peninsula. Sources: (Ministerio para la Transición Ecológica y el Reto Demográfico., 2023)

Figura 4. Produção de pedra natural em Espanha, Portugal e Península Ibérica. Fontes: (Ministério da Transição Ecológica e do Desafio Demográfico, 2023)