The dimension Stone Market and the Role of Dimension Stone in Poland

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Abstract

The stone industry is highly specific. On the one hand, it is linked to the domestic production of dimension stone. On the other, it has ties with the global market, and these are even stronger. Supported by new technological advances, the industry is capable of supplying a remarkably processed product. This opens extensive opportunities for the building stone market to develop. The multiplier effect could be triggered by the construction industry, which is one of the key drivers of the Polish economy. Along with the "headstone production industry", it also encourages the development of the building stone market – considered broadly, from quarrying, to processing plants, wholesale stone suppliers, to a whole group of stone fitters.

Keywords: dimension stone, processing plants, stone market

Introduction

The stone industry is highly specific. It is linked to the domestic production of dimension stone but is also closely correlated with the global market. Stone used to produce stone elements is either sourced locally or imported. The diverse physical properties and varied colours and textures of rocks allow their use in various fields of the construction industry and economy. Roads, architecture, construction, and ornaments are only some of the most common applications of stone. The extraction and processing technologies as well as cutting-edge machinery make it possible to mine deposits located in Poland, providing the raw material for roads, architectural features, and elements of building and monumental stone, etc. Dimension stone has a number of applications in structural landscaping and the construction industry [7, 9].

The presented analysis of the state of the construction industry aims to confirm the interrelation between the size of the stone element market and the construction industry. The focus of this paper is on describing the functioning of the stone industry, i.e. stonemasons, and of the stone sector. The analysis of the collected data on stone distribution in recent years (information from industry-specific literature, such as [1–4, 8] and information obtained from companies providing stonemasonry services) facilitated the indication of the major directions of dimension stone import and its depiction in quantitative and value terms.

Construction industry analysis

The stone industry, supported by new technological advances, is capable of supplying a remarkably processed product. This opens extensive opportunities for the building stone market to develop. Since the construction industry is the driving force of the economy, it can initiate or contribute to a stronger multiplier effect. Along with the "headstone production industry", it is also the driving force for the development of the building stone market, from quarrying, to processing plants, wholesale stone suppliers, to a whole group of stone fitters. These are the reasons behind this analysis of residential infrastructure and public building industries in individual voivodeships.

Tables 1 and 2 and Figures 1–4 present data on the residential building industry for 2015-2017 broken down by voivodeship [5].

Table 3 and Figures 5 and 6 present the structure of infrastructure related to residential and non-residential buildings in 2015–2017.

The analysis of the individual tables and figures shows that the number of completed dwellings and buildings clearly influences the development of individual regions and the demand for building stone elements. The largest numbers of stonemasons and companies operating in wholesale and retail of stone materials are recorded in those voivodeships in which the largest number of buildings are completed.

Dimension stone imports and exports

The deposits that play the most important role in the building stone industry worldwide are those of granite, marble, and sandstone. They can be found in various locations of the world. In Europe, the best-known is marble from Italy, Greece, and Spain. When it comes to granite, the major producers are Scandinavia, Ukraine, Poland, and the Czech Republic. Enormous granite and marble deposits can be found in Asia, in particular in China and India, while other rich deposits are also in Thailand, Turkey, Iran, and South Korea. While these resources are less common on other continents, Brazil, South Africa, the USA, Mexico, Egypt, and Pakistan also have a substantial resource base.

In recent years, Europe, which was previously a leader in terms of extraction, has been overtaken by Asia. Currently, the Asian production volume is twice the size of that in Europe. China is the world's largest producer of stone materials, supplying mainly granite and marble slabs and blocks. India, Iran, and Turkey have recently joined the group of the leading producers of dimension stone. American countries,

Tab. 1. Dwellings completed in 2015–2017, own work on the basis of [5]
Tab. 1. Mieszkania oddane do użytku w latach 2015–2017, opracowanie własne na podstawie [5]

Name/voivodeship	Dwellings in new residential buildings			Dwellings obtained through the extension of residential and non-residential buildings			Dwellings obtained through alteration or adaptation of non-residential premises in residential and non-residential buildings		
	total			total			total		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
	[-]	[-]	[-]	[-]	[-]	[-]	[-]	[-]	[-]
Dolnośląskie	13720	16227	16791	198	84	95	117	195	179
Kujawsko-Pomorskie	6466	6106	7449	80	42	93	168	114	201
Lubelskie	6068	6849	7257	70	60	54	91	111	50
Lubuskie	3094	3434	3879	25	23	12	114	126	109
Łódzkie	6933	6870	7292	122	136	108	95	59	73
Małopolskie	14192	16880	19541	223	422	215	185	77	207
Mazowieckie	28826	35640	36664	307	323	520	94	86	90
Opolskie	1662	1733	1943	48	27	49	13	8	9
Podkarpackie	7523	7775	7886	97	78	181	20	22	64
Podlaskie	4687	4634	4943	40	37	42	35	28	38
Pomorskie	13044	13032	15495	90	67	265	48	56	55
Śląskie	9713	10681	11725	289	258	279	150	81	223
Świętokrzyskie	3380	2946	3077	20	63	59	9	11	15
Warmińsko-Mazurskie	4098	4495	4533	60	13	46	152	63	204
Wielkopolskie	15558	15877	18430	169	182	210	341	353	219
Zachodniopomorskie	5165	6710	7302	32	113	26	80	118	145
Poland	144129	159889	174207	1870	1928	2254	1712	1508	1881

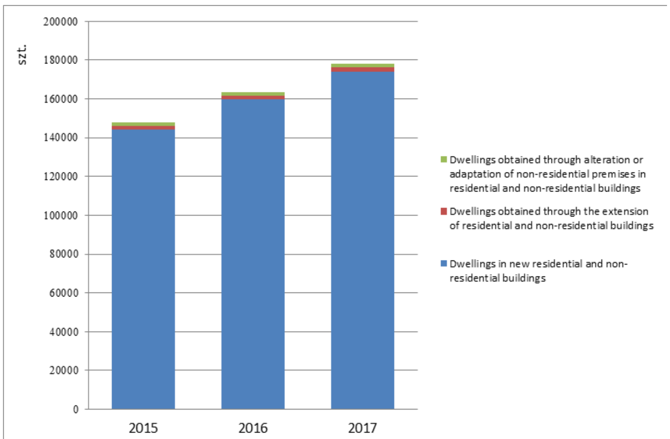

Fig. 1. Dwellings completed in residential and non-residential buildings in 2015–2017, own work on the basis of [5]
Rys. 1. Mieszkania oddane do użytku w budynkach mieszkalnych i niemieszkalnych w latach 2015–2017, opracowanie własne na podstawie [5]

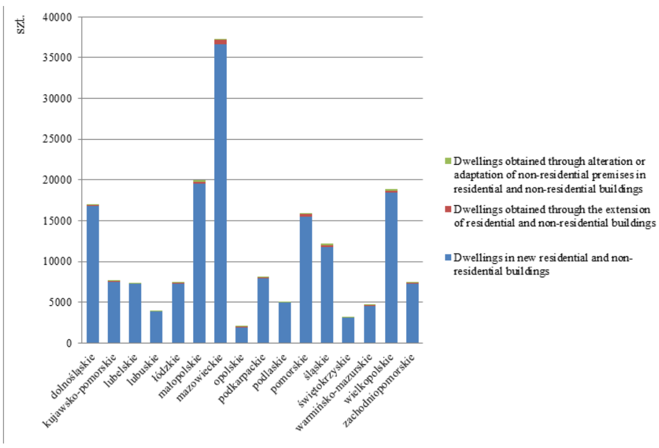

Fig. 2. Dwellings completed in residential and non-residential buildings by voivodeship in 2017, own work on the basis of [5]
Rys. 2. Mieszkania oddane do użytkowania w budynkach mieszkalnych i niemieszkalnych do 2017 r., Opracowanie własne na podstawie [5]

Tab. 2. Dwellings completed, including the number of dwellings whose construction started and the number of building permits issued in 2015–2017, own work on the basis of [5]
Tab. 2. Mieszkania oddane do użytku, w tym liczba mieszkań, których budowę rozpoczęto, oraz liczba pozwoleń na budowę wydanych w latach 2015–2017, opracowanie własne na podstawie [5]

Name	Dwellings whose construction started			Dwellings with building permits			Completed dwellings		
	total			total			total		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
	[-]	[-]	[-]	[-]	[-]	[-]	[-]	[-]	[-]
Dolnośląskie	16860	17051	19229	19258	21987	27772	14035	16506	17065
Kujawsko-Pomorskie	6631	7523	8743	8571	8012	11176	6714	6262	7743
Lubelskie	7653	6902	7355	7833	7847	8031	6229	7020	7361
Lubuskie	4000	4172	4643	4269	5499	5983	3233	3583	4000
Łódzkie	7498	7633	8928	8184	10898	11568	7150	7065	7473
Małopolskie	19373	16553	20558	17334	20742	25333	14600	17379	19963
Mazowieckie	34964	38588	43243	41922	42140	50936	29227	36049	37274
Opolskie	1613	2025	2599	1771	2536	2419	1723	1768	2001
Podkarpackie	7159	8108	9457	7658	9331	10575	7640	7875	8131
Podlaskie	4746	4405	5325	5456	4830	5683	4762	4699	5023
Pomorskie	13925	15527	19433	15484	19606	20794	13182	13155	15815
Śląskie	11066	13022	13135	13591	14963	19640	10152	11020	12227
Świętokrzyskie	3168	3387	3738	3063	4380	4239	3409	3020	3151
Warmińsko-Mazurskie	4300	3975	4651	6706	5754	6732	4310	4571	4783
Wielkopolskie	18715	18338	26484	19467	24689	26694	16068	16412	18859
Zachodniopomorskie	6732	6723	8469	8255	8351	12643	5277	6941	7473
Poland	168403	173932	205990	188822	211565	250218	147711	163325	178342

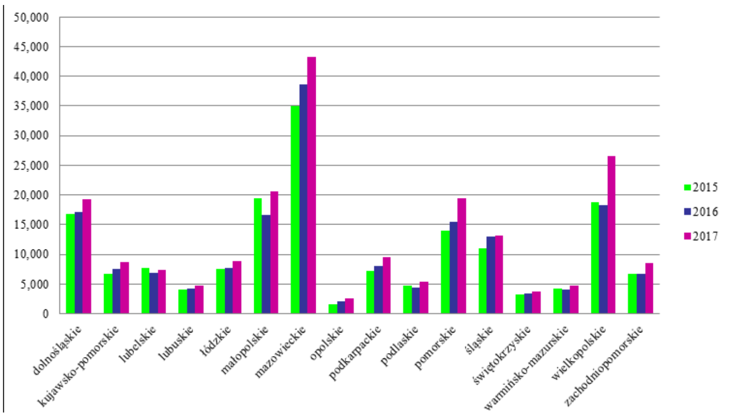

Fig. 3. Dwellings whose construction started in 2015–2017, own work on the basis of [5]
Rys. 3. Mieszkania, których budowę rozpoczęto w latach 2015–2017, opracowanie własne na podstawie [5]

and in particular Brazil, Mexico, and the USA, which were not major players on the market, are also gaining importance.

The largest exporters of granite blocks include China, India, Brazil, Italy, Spain, South Africa, Belgium, Turkey, Portugal, Norway, and Finland. And the largest recipients are South Korea, the USA, China, Germany, Italy, and Taiwan [8].

As regards Poland, it mainly imports marble and granite.

Stone import involves a number of processes that need to be completed in order to supply customers with appropriate products, and to meet their requirements in terms of quality and decor (colour). Factors taken into account include international rules for the production, transportation and acceptance of natural stone products, such as European rules for the marketing and use of natural stone products (in the EU this is Council Directive 89/106/EEC "Construction Products" [4]).

In 2017, energy raw materials accounted for the largest share of the imports and exports of mineral resources. The total exports of mineral resources in 2017 saw a 15.05% increase when compared to 2016, and amounted to PLN 50,294 million. Imports increased by 28.34% and amounted to PLN 91,694 million. The trade balance (imports-exports) was negative. In quantitative terms, in 2017, imports increased slightly, while the tonnage of mineral resources exports decreased slightly. Rock raw materials had the smallest share in foreign trade. In terms of imports, it was 3.1%, and for exports it amounted to 5.2% [5].

The balance for rock raw materials was negative and slightly worse than in 2016 (by 13,000 tonnes – 0.52%), amounting to more than 2.5 million tonnes. The trade balance remained negative and given a smaller increase in exports (by PLN 237 million, i.e. by approx. 10%) than in imports (by

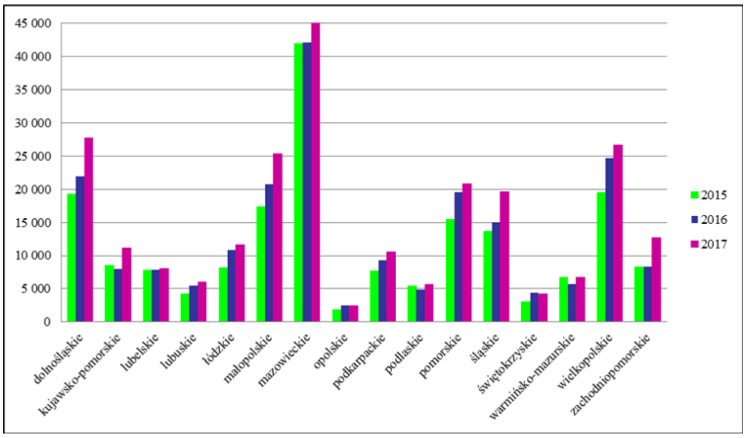

Fig. 4. Dwellings for which building permits were issued in 2015–2017, own work on the basis of [5]
Rys. 4. Mieszkania, na które wydano pozwolenia na budowę w latach 2015–2017, opracowanie własne na podstawie [5]

Tab. 3. Buildings completed in 2014–2016, own work on the basis of [5]
Tab. 3. Budynki ukończone w latach 2014–2016, opracowanie własne na podstawie [5]

Name	Non-residential buildings			New completed residential buildings		
	2015	2016	2017	2015	2016	2017
	[pcs.]			[pcs.]		
Dolnośląskie	5546	5453	5851	1356	1416	1293
Kujawsko-Pomorskie	3852	3957	3972	1401	1345	1260
Lubelskie	3749	3920	3810	1476	1252	1287
Lubuskie	1780	1743	1825	726	656	617
Łódzkie	4598	4495	4843	1826	1915	1911
Małopolskie	8132	7787	8569	1555	1433	1549
Mazowieckie	11681	11224	11883	2875	2658	2869
Opolskie	1288	1220	1335	511	552	496
Podkarpackie	5082	5044	5271	1396	1295	1338
Podlaskie	2326	2356	2498	919	933	929
Pomorskie	5149	5078	5706	1181	1087	1052
Śląskie	7210	7375	7882	2163	2453	2265
Świętokrzyskie	2415	2320	2548	876	850	802
Warmińsko-Mazurskie	2191	2032	2020	973	838	834
Wielkopolskie	8944	9137	9475	3283	2901	3032
Zachodniopomorskie	2720	2736	2828	1312	1488	1898
Poland	76663	75877	80316	23829	23072	23432

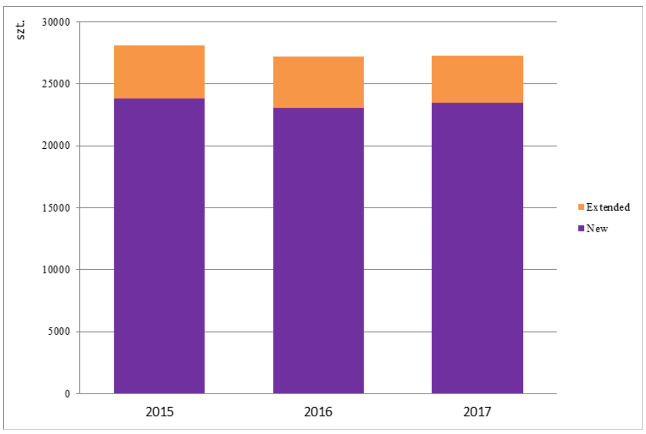

Fig. 5. Non-residential buildings completed in 2015–2017, own work on the basis of [5]
Rys. 5. Budynki niemieszkalne ukończone w latach 2015–2017, opracowanie własne na podstawie [5]

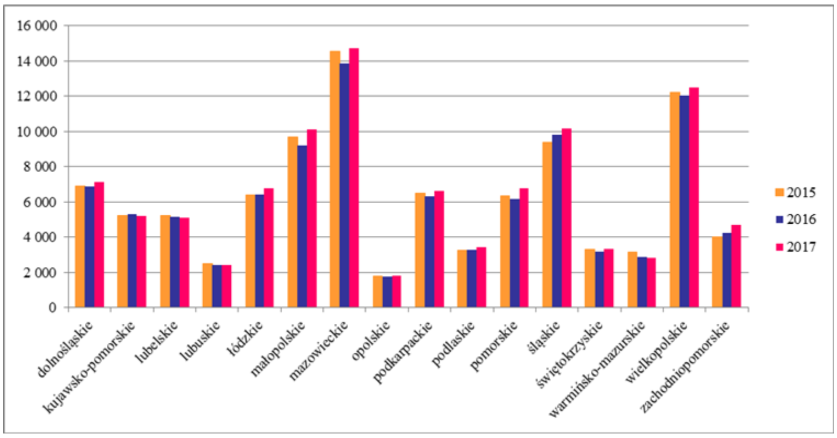

Fig. 6. New buildings completed in 2015–2017 by voivodeship, own work on the basis of [5]
Rys. 6. Nowe budynki ukończone w latach 2015–2017 według województw, opracowanie własne na podstawie [5]

Tab. 4. Imports of stone elements, own work on the basis of [6]
Tab. 4. Import elementów kamiennych, opracowanie własne na podstawie [6]

Dimension stone	2015		2016		2017		2018	
	Quantity [m^2]	Value [PLN million]	Quantity [m^2]	Value [PLN million]	Quantity [m^2]	Value [PLN million]	Quantity [m^2]	Value [PLN million]
Setts, road slabs, kerbs, and paving slabs (excluding slate)	25,310,924	13.5	27,322,634	17.3	33,329,174	21.7	63,439,086	35.1
Worked stone elements (excluding slate)	213,315,830	334.8	231,126,883	351.3	255,170,674	384.3	251,898,772	366.2
Worked slate, slate items and agglomerated slate items	6827248	14.9	9188752	20.0	5976606	12.7	6339974	15.9
Total	**245,454,002**	**363.2**	**267,638,269**	**388.5**	**294,476,454**	**418.7**	**321,677,832**	**417.2**

Tab. 5. Exports of stone elements, own work on the basis of [6]
Tab. 5. Eksport elementów kamiennych, opracowanie własne na podstawie [6]

Dimension stone	2015		2016		2017		2018	
	Quantity [m^2]	Value [PLN million]	Quantity [m^2]	Value [PLN million]	Quantity [m^2]	Value [PLN million]	Quantity [m^2]	Value [PLN million]
Setts, road slabs, kerbs, and paving slabs (excluding slate)	19,363,939	46.8	18,655,200	79.5	46,806,796	18.7	79,506,874	42.3
Worked stone elements (excluding slate)	101,562,874	34.2	100,583,842	33.9	34,160,297	100.6	33,929,933	111.1
Worked slate, slate items and agglomerated slate items	4,461,716	0.2	1,009,761	0.2	181,743	1.0	233,328	1.3
Total	**125,388,529**	**81.15**	**120,248,803**	**113.7**	**81,148,836**	**120.2**	**113,670,135**	**154.6**

PLN 289.9 million, i.e. by more than 11.2%), it was less favourable than in 2016, amounting to PLN 243.5 million [5].

In Poland, enterprises which deal in stone materials offer more than 440 types of stone in the "granite" category (igneous rocks) and 380 other types (carbonate rocks, sandstones, metamorphic rocks). Due to the marketing strategies employed by various companies, the same stone can have different names. They are sold in the form of blocks, slabs, and tiles. When they are not in stock, they can be ordered on request.

The values listed in Tables 4 and 5 indicate that in 2018 worked stone elements (excluding slate) accounted for the largest share in imports and exports, which generally narrowed this group down to products made of granite.

Table 6 presents global trends in dimension stone imports. The largest percentage of dimension stone elements are imported into Poland from China (approx. 45% of dimension stone imports). Figures 7–9 show countries which are the leading exporters of building and monumental stone to Poland.

Tab. 6. Directions of dimension stone imports, own work on the basis of [6]
Tab. 6. Kierunki importu kamienia wymiarowego, opracowanie własne na podstawie [6]

Country	Value [PLN million]
China	188.82
India	120.11
Italy	43.58
Germany	11.72
Belgium	8.05
Czech Republic	7.08
Brazil	5.33
Ukraine	5.03
Turkey	4.94
Spain	4.84
Vietnam	3.20
Portugal	2.71
United Kingdom	2.04
Netherlands	1.40
Pakistan	1.36
South Africa	0.87
Sweden	0.70
Greece	0.65
Indonesia	0.55
France	0.51
Other	2.69

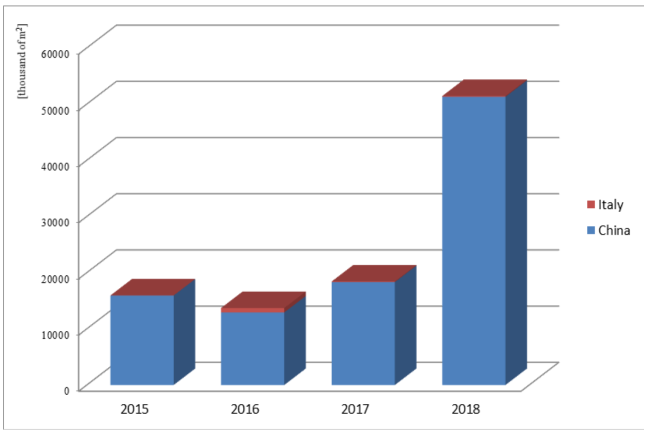

Fig. 7. Leading importers of setts, road slabs, kerbs, and paving slabs in 2015-2018, own work on the basis of [6]
Rys. 7. Wiodący importerzy płyt drogowych, krawężników i płyt chodnikowych w latach 2015–2018, opracowanie własne na podstawie [6]

Table 7 and Figure 10 present the number of enterprises which distributed dimension stone in 2014–2017 in specific voivodeships.

The stone market is significantly influenced by the production of headstones – the architecture of cemeteries. This is where certain risks can be identified. Firstly, cremation is gaining popularity, and, in a sense, it is in competition with the stone industry. Secondly, stonemasons compete with funeral homes which offer comprehensive services including headstone production. Furthermore, stonemasons must also compete with the many DIY stores which offer finished and attractively-priced building stone products. Those enterprises which deal in finished products can offer lower prices.

The Polish dimension stone industry includes some 5000 companies. These are mainly crafts – micro- and small enterprises which provide stonework services, and a small percentage of medium-sized companies (with more than 50 employees). Approximately 30% of them declare that they mainly produce and/or sell products for the purposes of the construction industry, about 30% of companies state that they mainly produce and/or sell headstones, while the remaining businesses report that they have no clear specialisation (production and/or trade on both markets).

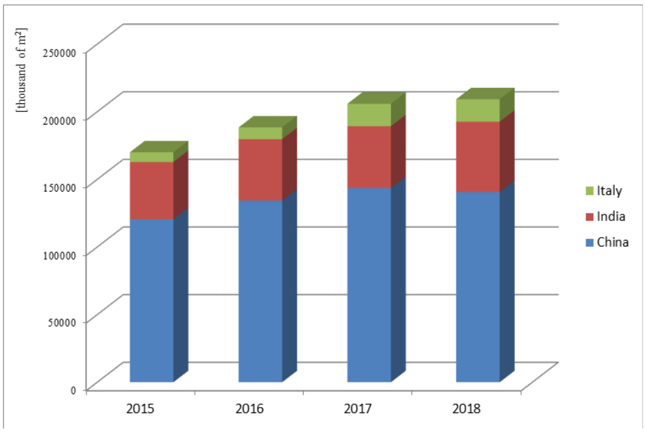

Fig. 8. Leading importers of elements of building and monumental stone in 2015-2018, own work on the basis of [6]
Rys. 8. Wiodący importerzy elementów budownictwa i kamienia monumentalnego w latach 2015-2018, opracowanie własne na podstawie [6]

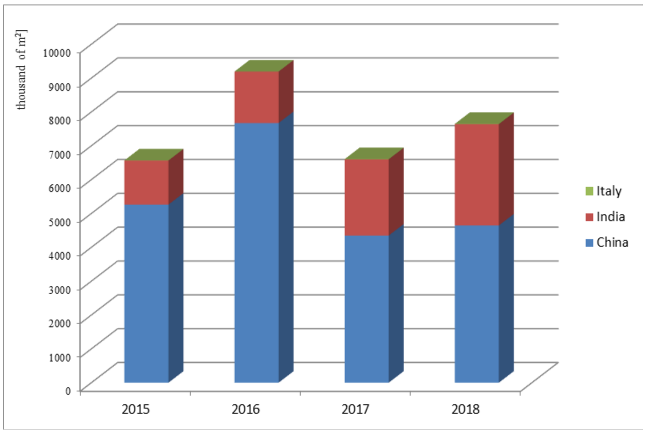

Fig. 9. Leading importers of worked slate, slate items and agglomerated slate items in 2015–2018, own work on the basis of [6]
Rys. 9. Wiodący importerzy łupków, łupków i aglomerowanych łupków w latach 2015–2018, opracowanie własne na podstawie [6]

Tab. 7. The number of enterprises distributing dimension stone in 2014-2017, own work on the basis of [2, 6, 10]
Tab. 7. Liczba przedsiębiorstw dystrybuujących kamień wymiarowy w latach 2014–2017, opracowanie własne na podstawie [2, 6, 10]

Voivodeship	2014	2015	2016	2017
Dolnośląskie	30	29	31	30
Kujawsko-Pomorskie	6	5	4	6
Lubelskie	11	7	12	11
Lubuskie	2	2	1	2
Łódzkie	14	15	13	13
Małopolskie	20	16	17	18
Mazowieckie	32	25	26	27
Opolskie	4	4	5	5
Podkarpackie	12	11	10	8
Podlaskie	6	6	8	8
Pomorskie	12	11	13	12
Śląskie	14	16	21	22
Świętokrzyskie	7	6	7	8
Warmińsko-Mazurskie	4	1	1	2
Wielkopolskie	13	12	12	13
Zachodniopomorskie	11	11	12	13
Poland	**197**	**176**	**192**	**197**

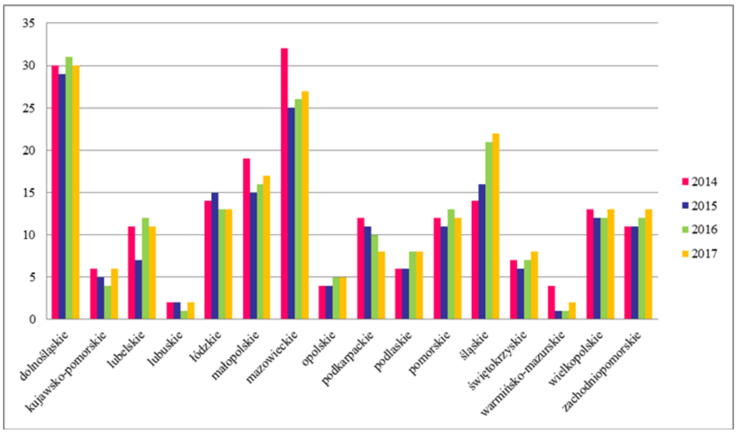

Fig. 10. Companies distributing stone in specific voivodeships in 2014–2017 [own work]
Rys. 10. Firmy zajmujące się dystrybucją kamienia w poszczególnych województwach w latach 2014–2017 [opracowanie własne]

Conclusion

1. The stone industry is linked to dimension stone mining. As dimension stone resources are relatively scarce in Poland, sourcing this material is strongly connected with the global market.

2. In Poland, enterprises which deal in stone materials offer more than 440 types of stone in the "granite" category (igneous rocks) and 380 other types (carbonate rocks, sandstones, metamorphic rocks). Due to the marketing strategies employed by various companies, the same stone can have different names. It is sold in the form of blocks, slabs, and tiles. When the product is not in stock, it can be ordered on request.

3. The number of completed dwellings and buildings (locally) influences the development of individual regions and demand for building stone elements. The largest numbers of stonemasons and companies dealing in wholesale and retail sale of stone materials are recorded in those voivodeships in which the largest number of construction entities are completed.

4. The stone market is significantly influenced by the production of headstones – the architecture of cemeteries.

Nevertheless, this specific type of activity is associated with certain risks. Firstly, cremation is gaining popularity, and, in a sense, it is in competition with the stone industry. And secondly, stonemasons compete with funeral homes which offer comprehensive services including headstone production.

5. Stonemasons must also compete with the many DIY stores which offer finished and attractively priced building stone products. Those enterprises which deal in finished products can offer lower prices.

6. Companies operating in the stone industry have extensively benefited from EU subsidies, which allowed them to modernise their machinery. Some cases of overinvestment can be noted here, and many companies decide to sell costly machines.

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Rynek kamieni wymiarowych i rola kamienia wymiarowego w Polsce

Przemysł kamieniarski jest bardzo specyficzny. Z jednej strony wiąże się to z krajową produkcją kamienia wymiarowego, z drugiej strony ma silne powiązania z rynkiem globalnym. Wspierany przez postęp technologiczny przemysł jest w stanie dostarczyć i przetworzyć produkt. Otwiera to szerokie możliwości rozwoju rynku kamienia. Efekt zwiększenia skali wywołuje przemysł budowlany, który jest jednym z kluczowych motorów polskiej gospodarki. Wraz z „przemysłem produkcji nagrobków” przemysł budowlany sprzyja rozwojowi rynku kamieni budowlanych – szeroko pojętego, od kamieniołomu, przez zakłady przetwórcze, hurtowych dostawców kamieni, po całą grupę monterów kamieni.

Słowa kluczowe: kamień wymiarowy, zakłady przetwórcze, rynek kamieni