A Work Project, presented as part of the requirements for the Award of a Master's degree in Management from the Nova School of Business and Economics.

INCREASING INTERNATIONAL FOOTPRINT OF A NATURAL STONE BUSINESS

Cláudia Viegas e Costa Marques

Guillaume Labarre

Inês Moraes Sarmento

Sara Oliveira São João

Tommaso Niccolò Bordignon

Work project carried out under the supervision of:

João Pedro Delgado

04-01-2021

This work is divided into seven different parts:

Part A: Increasing International Footprint of a Natural Stone Business

Part B: Increasing International Footprint of a Natural Stone Business - Geographical Analysis *(by Guillaume Labarre)*

Part C: Increasing International Footprint of a Natural Stone Business - In-depth Market Analysis (*by Tommaso Bordignon)*

Part D: Increasing International Footprint of a Natural Stone Business - Entry Strategy (*by Inês Moraes Sarmento)*

Part E: Increasing International Footprint of a Natural Stone Business - Marketing Plan *(by Cláudia Marques)*

Part F: Increasing International Footprint of a Natural Stone Business- Financial Plan (*by Sara São João)*

Part G: Increasing International Footprint of a Natural Stone Business - Final Remarks

List of Abbreviations:

A&D: Architecture and Design

CSF: Cutting, Shaping, and Finishing

DP: Company the group is doing this project for, short for DP Stones

DP.1: DP's subsidiary

FOB: Free on Board

KPIs: Key Performance Indicators

M&Q: Mining & Quarrying

SA: Strategic Alliance

WC: Worse Case Scenario

BC: Best Case Scenario

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Abstract

DP Stones is a Portuguese medium-sized company that works in the Cutting, Shaping and Finishing Stone business. This company has already a significant international footprint, dealing mainly with direct exports. Facing a saturated domestic market, DP aims to extend its' lifecycle and find out new ways to gain competitive advantages.

Accordingly, this project will analyse the current and future state of the CSF industry and assess possible target markets for DP to expand to. Afterwards, an entry strategy and marketing plan will be developed as well as a financial plan to evaluate the viability of the project proposed.

Keywords (Internationalization, Market Selection, Entry Strategy, Strategic Analysis, Natural Stone, Cutting Shaping and Finishing Stone, Marketing Plan, Financial Plan, Australia, Germany)

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

Part A: Increasing International Footprint of a Natural Stone Business

1 Introduction

1.1 Organizational Challenge and Objectives

Organizational Challenge: While operating in a very competitive market, DP Stones faces a saturated domestic market and is reaching maturity. To extend its lifecycle, the company will have to lock in and acquire clients that ensure stable demand.

Objectives: The team aims to develop an internationalization plan which ultimately extends DP Stones' lifecycle. Currently, the company engages in direct trading in various international markets, nonetheless by increasing its international footprint DP will be able to extend its' customer base and improve its' revenue streams, maintaining a competitive position in the market.

1.2 Project Overview and Methodology

To extend DP's lifecycle, the team developed an expansion plan comprising seven different phases. Firstly, the team analysed the company as well as the industry in which it operates. Secondly, the international readiness of the company was assessed and the three most adequate countries to internationalize were discovered through a ranking and clustering analysis. Thirdly, an in-depth market analysis was performed on the three markets, further exploring the conditions to enter those markets. Having considered possible entry modes in both Australia and Germany in the fourth phase, the most adequate ones were chosen, and an entry strategy was derived. Then, both the marketing and financing plans were outlined, assuring the viability of the proposed strategy. Finally, conclusions were drawn and recommendations and future considerations were defined.

2 Situation Analysis

2.1 Company Analysis

2.1.1 Profile and Management

Created in 1980, DP Stones has been one of the main players in the **CSF Stone industry** for the past forty years. The company focuses on high-quality natural stones and maintains a competitive position in the market due to strong commitment and hard work.

DP is owned by three shareholders, each holding one-third of the share of the enterprise. This **medium family-enterprise** first specialized in Portuguese marble and limestone, and in 2005 started working with international natural stone with the creation of a subsidiary (DP.1).

In 2017, a change in leadership occurred and brought a new mindset to the company. The new CEO chose to merge the two businesses to increase the overall production and operation efficiency. DP facilities have mainly Portuguese stones to be sold all over the word and DP.1 is a selling point with foreign (imported) stones to be sold in Portugal. The latter works also as a showroom.

The CEO aims to improve DP's communication process and product offering. In line with this, the website was renewed and new agreements on imported stones were established. In 2019, DP employed 77 full time workers and had an exploitation result of **€7.03 m**. (See appendix 1 below)

2.1.2 Product Overview

DP is an active player in the CSF Stone industry and its strategy focuses on **Portfolio Depth** by offering a wide range of natural stones. DP is exporting 80% of its products to other countries. For each project, DP finds the raw materials that better fits the requirements of the client and adapts them to the forms and textures they wanted.

Regarding the processing of raw material, the company works with three standard shapes: **Blocks, Slabs, and Tiles** (Dimpomar 2019). Two different blocks from the same type of stone can translate into different profitability due mostly to the patterns of veins and the percentage of wasted stone. These situations can be foreseen and accessed with the knowledge and know-how that the company has been gathering throughout its' years of production.

In slabs, the company is a leading market player market being valued for the variety, novelty, quality, and trendiness of its products. Tiles are valued for their flexibility in dimensions, thickness, and finishes, as well as their quality and quantity.

The company's end-product also translates into **Cut to Size projects and Special Products** (Dimpomar 2019). DP has extended its international footprint by being part of major projects in fifteen different countries. Projects may be distinguished into three different categories: Commercial Projects, Residential or Private Projects, and Special Projects.

Special projects are a new development of exclusive and unique cut-to-size design pieces. This is an emerging sector within the company that arose by making use of the existing know-how and the available resources. Some examples are Washbasins, Shower-trays, and Decoration products.

2.1.3 Process & Operations of DP

DP plays different roles along the supply chain - from the stone extraction to the client final delivery. The selection of stone and CSF of stone are the company's core activities. Going to the stone quarries and **selecting the right blocks** is a key operation to guarantee quality stone is obtained. With years of experience and plenty of knowledge in the natural stone industry, DP can predict the percentage of waste and evaluate its quality. Performing these activities resulted in a wide national and international network of supply. This enables DP to broaden its product portfolio and attract new customers all over the world.

Processing the stone is part of DP's core business and therefore an area in which the company stands out. Efficient operation processes are achieved with high-quality machinery and experienced workers, allowing DP to work the stone with precision in every aspect.

DP also performs complementary activities in Portugal as it is the case of product **packaging and transportation**. Stone is stocked in wooden boxes that are made in-house to better suit product protection. By outsourcing wood and assembling the packages itself, the company is shifting transportation risks towards its supplier, for instance, broken material due to rotten wood. Few workers in DP are dedicated to creating the packages.

Regarding transportation, owning a truck, containers and groupage enable efficient and safe loadings, especially when the stocks carried are sensitive types of stones. Transportation from DP facilities to the harbour or vice versa is carried by a company employee. Afterwards, all the transportation services used to deliver the product to the final client are outsourced. Since DP follows the Free On-Board incoterm rules, transportation costs, risks and responsibilities are on the client's side from the moment the stone is loaded on the vessel onwards.

2.1.4 Positioning and Strategy

The Bowman's Strategic Clock was used to explore DP's options for strategic positioning. The company sells high quality products with the highest level of perceived added value. However, due to industry experience, expertise, and the company's capability to reduce to the minimum waste, DP is able to offer competitive prices comparing to the products' quality level. For these reasons, the group identified DP positioning in the "**Differentiation strategy"**.

Their innovative technology enables a wide range of service offerings, to closely tailor their clients' requests and efficacy in production, which allows reduced costs and efficient prices.

By engaging in various phases of the supply chain, they rapidly provide their clients with samples, logistics, and answers.

Another important pillar is DP's culture to maintain long-lasting relationships with their customers. "At DP we have been working with some clients for more than twenty years, it is our tradition to keep clients. This is only possible due to the service we provide, always carrying an open communication channel", said the sales manager.

2.1.5 Business Model

To fully understand DP's Business Model all nine segments will be carefully analysed. (See appendix 15 below) The company's **value proposition** is to offer high-quality natural stone with features such as durability, resistance to corrosion, and slip resistance, supported by DP's know-how and long experience in the industry. Also, DP's high status is translated through attractive stone availability for clients to build unique spaces.

Companies need to assess which customers they should focus on to find ways to build and sustain relationships with them. DP serves various **customer segments** including individuals, construction companies (which can also include consultants, small architecture, and design companies), wholesalers, and other CSF companies. While individuals directly buy the stone from DP, construction companies often play the role of intermediary between these two. Wholesalers buy in large quantities and resell to their market, and CSF companies buy stone blocks to cut, shape, and finish them and later sell them in their markets.

To approach customers, it uses **channels** such as word of mouth, newsletters, magazines, international events as fairs, an official website, social media and its Portuguese facilities (DP and DP.1). To maintain strong **customer relationships**, reputation and trust are key. DP holds long-term client relationships through dedicated personal assistance, close and continued communication.

The company has stone quarries, national and international associations, and transportation companies as **key partners**, each playing a different and important role throughout the value chain. While stone quarries grant access to the core business' materials, associations facilitate the trading and transportation companies enable the final clients to receive their products. **Key activities** are assuring quality throughout the value chain, building relationships with clients and suppliers, stone selection, cutting blocks into slabs and tiles, and cut to size projects. These result from DP owning the **key resources** of stone, competitive machinery, industry experience and knowledge, client, and supplier networks.

On **revenue streams**, DP receives transaction-based revenues (namely asset sales), where it gets a one-time payment for the stone purchased. Money is received per contract in blocks, slabs, tiles, and cut to size. Depending on the project type, contract payments are product feature dependant or volume dependant.

DP's **costs structure** is characterized by value-driven costs, focusing on value creation and premium value proposition. It has fixed costs such as employees' salaries, manufacturing facilities-related expenses, machinery, and some others. Variables costs are raw materials such as the stone and wood supplied.

2.1.6 Financial Overview

To grasp the company's financial situation its **financial statements** will be analysed. (see Appendix 2 below) The **P&L** will be the first statement considered. Looking at the company's revenues from 2013 to 2019 (see Appendix 3 below) it is possible to observe a subtle decline from 2013 until 2016, moment from which the sales remained close to the €6 m level.

Regarding the operating income (see Appendix 4 below), DP shows difficulties in remaining stable since the EBIT varies from nearly €800 000 to €-200 000. An observation that can be retrieved is that the operation income does not follow the same evolution as revenues. For

instance, the EBIT increases from 2013 to 2014 while in the same period the level of sales decreased. The same happens from 2017 to 2018, when the level of sales decreases, and the operating income increases by more than €155 000.

The operating income has a great impact on the company's net income. As it is possible to observe, the net income (see Appendix 5 below**)** of DP is also very unstable through the different periods. For instance, in 2017 the losses were valued at €65 475 while in 2019 DP had a profit of €120 690. These abrupt changes might be explained by the instability related to the operating income. Such observations may lead one to believe that the company is relying too much on reactive opportunities and does not seem to have a proactive strategy regarding the natural stone industry and its opportunities.

The **balance sheet** (2017-2019) will be the second financial statement considered. (see Appendix 2 below) Regarding the total assets of DP (see Appendix 6 below), both current and fixed assets remain approximately constant throughout the periods, with current assets accounting for the biggest percentage, on average representing 80.87% of total assets.

The total liabilities of DP (see Appendix 7 below) vary between approximately €1 m and €1.4 m, being at its highest in 2018. Almost 97% of total liabilities are composed of short-term liabilities such as advance deposits from clients or supplier accounts.

The total equity (see Appendix 8 below) has been increasing every year reaching more than €8.7 m in 2019. This increase can be explained by both the increase in net income from each period and the account 'Other changes recognized inequity' in which changes in exchange rates and tax refunds can be accounted for.

Next, **ratios** will be computed to evaluate the company's performance. To assess the **liquidity** of the company, the current ratio (of 8.05), quick ratio (of 6.83), cash ratio (of 2.61), and Net

Working Capital (€6 784 576) were computed for 2019 (see Appendix 9 below). All these ratios indicate how the company is using assets to settle liabilities as debts and payables.

Given that all the liquidity ratios are considerably high, it is possible to conclude the company is in good financial health and it can pay its obligations with existing assets. Nevertheless, with such high ratios, one may think the company is risk-averse, as it is leaving too much cash on the side that could be invested to grow the business.

In regard to **solvency,** the debt-to-equity ratio (of 0.0003), debt-to-asset ratio (of 0.0003), financial leverage ratio (of 1.1184), debt structure ratio (near to 0), and net debt to EBITDA ratio (of –15.9798) were computed for 2019 (see Appendix 10 below). The solvency ratios allow the examination of the company's ability to meet its long-term debt obligations (Fuhrmann 2019).

With these numbers, one can affirm that the solvency of DP is extremely high. Not only the amount of debt is especially low, but the long-term debt is also inexistent. Once again this leads to the conclusion DP is financially healthy and stable.

From an **efficiency** point of view, the ratios total assets turnover (of 0.61), fixed assets turnover (of 2.91), inventory turnover (of 5.13), days to sell inventory (of 130), average collection period, average payment period (of 100), and cash conversion cycle (of 222) were computed for 2019 (see Appendix 11 below). These efficiency ratios help to identify how well the company uses its assets and liabilities internally.

According to the numbers reached, it is possible to conclude that in terms of asset efficiency DP is similar to the overall industry (Kenton 2020). Nonetheless, the days to sell inventories and to collect from clients are much higher than industry averages (see Appendix 12 below). This can present a disadvantage in the case DP faces financial difficulties given the high cash conversion cycle. By improving the inventory turnover, DP would be able to increase the

efficiency of its operations and consequently solve the problems related to the company's efficiency.

To access the **risk** of DP's operations, the ratios breakeven point (of 3521657), the margin of safety (of 41%), degree of operational leverage (of 17.65), degree of financial leverage (of 1), tax burden (0.77), and degree of combined leverage (of 17.65) were computed for 2019 (see Appendix 13 below).

Thus, one can affirm that DP does not face high risks. Not only, it has a good margin of safety to pay its liabilities with the sales from operations, but also the tax burden is following the industry average. Nonetheless, DP shows to have an operational income quite sensitive to changes in sales given that a 1% change in sales will result in a 17.65% in the EBIT. Taking this into consideration, and to avoid future operational risks, DP must endeavour to maintain the level of sales as stable as possible.

To conclude the ratios analysis, the **profitability** of DP in 2019 was evaluated (see Appendix 14 below). DP's gross margin ratio of 46.11% is higher than the industry average (19.3%), which can represent a competitive advantage for the company. A return on sales ratio of 2.61% means that for each euro of revenue there are 0.026 euros of profit being produced, which is lower than the industry average (6.4%). The return on assets ratio is 1.60%, lower than the industry average (7.5%). The return on equity is 1.39% which means that for every 100 euros of equity invested, the company produces 1.39 euros of profit. This is also slightly lower than the industry average (12.6%), making it difficult for DP to gather investors.

After having grasped the financial statements and ratios of DP it is possible to conclude that it is **financially healthy** in what respects to liquidity, solvency, and risk perspectives. Nonetheless, the company has **numerous possibilities to grow**, not only by making its

operations more efficient but mostly by starting to implement a clear proactive strategy to take advantage of the market opportunities.

As a final remark, it is extremely important to take into consideration the **COVID-19 impact** on the financials. The analysis was based on financial statements from 2019 that do not show the influence of the pandemic. With the cooperation of DP, it was possible to start retrieving information from the ongoing operations and conclude that, as expected, COVID-19 is having a direct impact on its operations and sales during 2020. As a matter of fact, given DP's focus on high-end product offerings it is expected that the purchase decision of such products will be delayed. The recent lockdown resulted in salary cuts, an increase in unemployment, and a general decrease in the population's disposable income which explains DP's lower demand.

2.2 Customers Analysis

2.2.1 International Client Base

In 2019, DP was present in 47 different countries and **83.8% of its products were exported.** With total sales of €6.12 m, €3.52 m were sold to **European countries** which in relative terms represents 57.46% of its sales. The **Asian continent** represents 29.69% of sales, **North America** 9.19%, and **Oceania** 2.84%. When considering sales on a country level, the United Kingdom (26.64%), China (18.51%), and Portugal (16.6%) are DP's 3 top buyers in 2019 and 2018 (see Appendix 23 below**)**.

DP's client list has 576 different clients, the biggest being a reseller of natural stone to European countries in the United Kingdom. Portugal has by far the biggest representation with 368 different clients that together account for €1.02 m of sales. The United States and the United Kingdom occupy second and third place, with 31 and 28 clients respectively (see Appendix 25 below). Clients are mostly enterprises in the natural stone, construction, and architecture market. Please note these architect companies mentioned are construction companies that also

do architectural projects. (Architect and Design companies *per se* are not the main focus of DP as they do not buy stone but simply prescribe alternatives to their clients) In Portugal is also possible to find some individuals as clients that buy smaller quantities.

2.2.2 Client Distribution and Profitability Assessment

The group further analysed the **transactions of DP's subsidiary (DP.1) from 2015 to 2019**. Results of this analysis may be found in Appendixes 28 below, 29 below, 30 below. Moreover, to access the average volume of transactions, the average price per square meter was assumed at 24.04€. Over the past five years, DP.1 registered total revenue of 4 055 371.49€ by serving 661 clients which can be further divided into five identifiable categories: Architect Companies, Construction Companies, Individuals, Marble Suppliers, Wholesalers & Retailers.

Marble Suppliers accounted for 45% of total sales over the last five years. This category brought the biggest average revenue per transaction (6 968.90€) and volume (290m²). Individuals accounted for 30% of total sales during this period. Although this category is represented by a robust number of clients (222), their purchases are lower in average value (5 397.90€) and volume (225m²).

Construction Companies, on the other hand, accounted for only 14% of total revenue. However, the category represented a lower number of clients (87), with a higher average value per transaction (6 530.31€) and volume (272m²). Architect Companies represented 6% of total sales. On average, these 42 clients carried out purchases of 6 163.80€ accounting for 256m² of stone.

Wholesalers and Retailers were the weakest categories, representing only 3% of total sales. DP.1 served 31 clients of this category who realized purchases of 3 312.79€ and 138m² per transaction. Finally, DP.1 transacted with 20 unidentified clients on a total value of 122

379.59€. These clients amounted to an average revenue per transaction of 6 118.98€ and an average of 225m².

2.2.3 Clients' Needs Assessment

To better understand how each client type values DP's products Clients' Needs were assessed (see Appendix 31 below). Client Categories were evaluated based on six product features: **Quality of raw material**; **Price**; **Durability**; **Flexibility in cuts, shapes, and finishes**; **Trendiness**; and **Role**. Moreover, DP's response to clients' needs was also assessed based on the same product features. Although the company serves Marble Suppliers, they are both clients and competitors. As such, this category was not included in the following analysis.

Individual clients are in contact with DP either directly or through a distribution channel, such as wholesalers, architecture and design companies, or construction companies. These clients are looking for a one-time interaction with the company, and to apply stone in a renovating project. As such, flexibility in cuts, shapes, and finishes are highly valued. The products purchased by these customers include tiles, cut-to-size products.

Individuals are attracted by high-quality stones for their luxurious appearance, nevertheless, they need intermediaries to fully understand the nature and related price of each type of stone. Although cost-driven, individuals are willing to pay higher prices for the status provided by luxurious products, being highly influenced by trends and intermediaries.

Due to the nature of their business, **Construction Companies** are very important demand drivers of cut-to-size projects. Their projects are usually big and as such their purchases represent high volumes in money and quantity of stone. It is important to note that Architecture and Design companies are active participants in the decision process of Construction companies, by recommending them on types of stone that best fit their projects. Moreover, Architecture companies are trend creators shaping design guidelines of construction projects.

Nonetheless, the price sensitivity of construction companies is highly dependent on the budget set by their clients for the project.

Quality, durability, and flexibility in cuts, shapes, and finishes are highly valued by these companies since they influence the applicability of stone to their projects, and maintenance services to their customers represent additional costs.

Architecture and Design Companies play a very important role as prescribers of DP's products, by suggesting to construction companies a particular type of material for their projects. Due to the nature of their business, architecture and design companies possess a deep understanding of products' features and are attracted by high-quality materials. These companies influence the global trendiness of types of stone, and the flexibility in cuts, shapes, and finishes is fundamental as it enables them to fully express their creativity.

Durability is a highly valued feature as some of these companies offer maintenance services to their customers. By recognizing and valuing product quality, architecture and design companies have a high willingness to pay.

Wholesalers and Retailer's customers look for diverse pricing options, as such these clients value the availability of products with different price and quality options. Moreover, wholesalers are price-driven shifting between stone suppliers according to their pricing deals.

These clients sell standardizable products, as such, they do not value flexibility in cuts, shapes, and finishes as much as other customers, looking to purchase various stone types of tiles. Furthermore, trendiness is not as valued as the variety of stones by these clients.

To answer its' clients' needs **DP offers** high-quality stone with distinguishable cuts, shapes, and finishes which meet every possible need. Due to the high quality of raw material used the products supplied by the company do not need a lot of maintenance. Furthermore, the company has developed a wide stone portfolio and supplier network through its decades of experience,

being therefore able to anticipate and respond to the latest and future trends as well as to provide its client's products with different price ranges which can accommodate their budgets.

2.3 Competitors Analysis

2.3.1 Country Competitors

There are two types of competitors: companies that started by being quarries and later started CSF stone to sell directly to the end customers; and companies such as DP that are specialized in the CSF stone, but do not operate a quarry of their own.

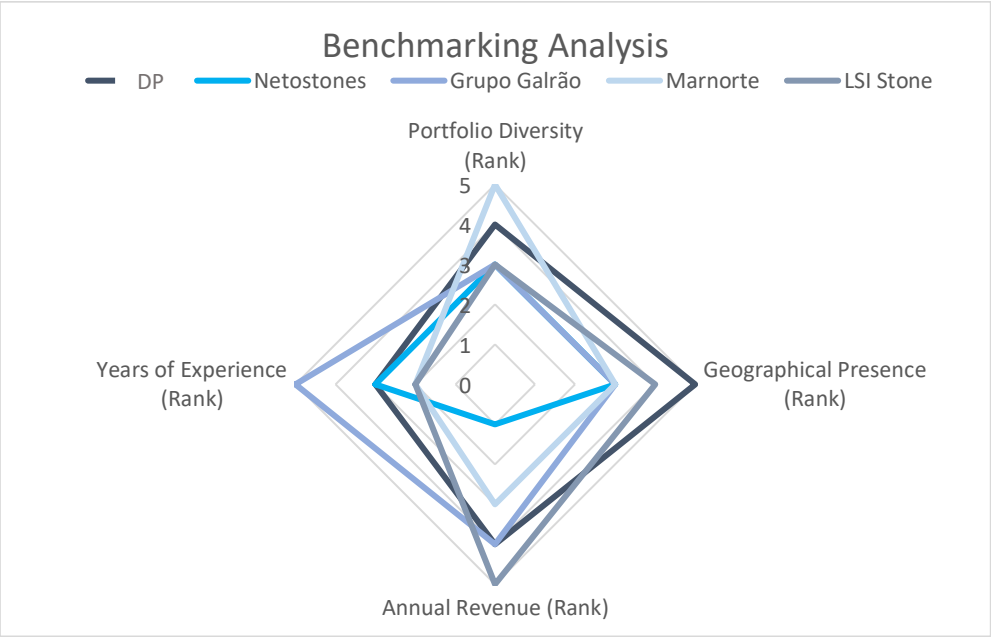
For the **first category**, it is possible to identify enterprises such as Solansis, MVC, Pedra Moca, or Grupo Galrão. For instance, Grupo Galrão (Grupo Galrão 2021) has currently a production capacity of over 7000m³ with more than twelve different hues and marble colours. By having quarries of their own, these players can offer competitive prices due to higher control over the initial stages of the supply chain, which translates in lower raw material costs. Moreover, they can easily answer to high volume orders, usually offered by the government and big construction companies.

The **second category** of competitors is national and international players that buy raw material directly from quarries all over the world. In most cases, these companies cannot compete on prices as they do not own quarries and are unable to take advantage of economies of scale, which forces them to build advantages on other characteristics. These players' experience allows them to increase price (and thus profit margin) since they add value by minimizing waste risk. Players within this category, as DP and Netostones (Netostones s.d.), usually work in lower-scale projects with medium construction companies and individual clients.

2.3.2 Benchmark Analysis

To help define the competitive landscape of the Portuguese Natural Stone industry a benchmarking analysis was conducted. By comparing DP with four of its main direct competitors in Portugal it was possible to identify its positioning and competitive advantages in the market.

The four companies to which a benchmarking analysis was performed were Netostones, Grupo Galrão, Marnorte (Marnorte 2020), and LSI Stone (LSI Stone 2020). The variables selected to measure companies were stone portfolio diversity, geographical presence, annual revenue, and years of experience.



In terms of geographical presence, DP is the one with the highest international footprint. Nonetheless, in terms of portfolio diversity, Marnorte has the widest offer with more than 200 different types of stones. Regarding the annual revenue, LSI Stone takes the lead with €8.02 m in 2019. The last variable analysed was years of experience where Grupo Galrão has the highest score given its 65 years of experience since its foundation in 1955.

2.3.3 International Competitors

The natural stone market is very competitive and after the massive entry of new players such as Turkey and China in the early ’80s, the industry is now stabilizing and maturing. In terms of the most prominent regions, Asia holds a dominant position, having a market share of more than 34% (Allied Market Research 2021). Countries such as India, China, Malaysia, and Indonesia are the main players of this region.

Following the Asian markets, the most prominent region is North America. The dominant player in this region is the US with €2 643 m in production turnover. The European region is also very important in this industry with countries such as Italy, Spain, and Greece that before the entry of developing countries used to be the market leaders.

To face the increase in global competition, key players in the market have been trying to adopt strategies that have a great impact on the industry. These decisions may influence other players in the market such as mergers and acquisitions, priming for access to a new type of stones with higher demand. An example of this situation is when Polycor INC merged (Polycor Inc. 2018) in October 2018 with the Indiana Limestone company. Nonetheless, there are other strategies that natural stone players have been implementing to increase their customer bases, such as showrooms and galleries.

The main worldwide players and competitors are listed below (Market Watch s.d.).

Polycor Inc	Founded in Quebec in 1987, it is the world’s leading natural stone quarrier with over 50 quarries, 1200 employees and 18 manufacturing plants around the world (Polycor Inc. 2018).
Levantina	Founded in Spain in 1959, it is considered a world reference in the field of Natural Stone and a pioneer in the large-format porcelain tiles and fine thickness, Techlam (Levantina: The Natural Stone Company 2021).
Dermitzakis	Founded in Greece in 1990, it is one of the most successful companies in the marble sector with a strong orientation to international markets, with 85% of its sales being exported to more than 81 countries (Dermitzakis 2020).
Xishi Group	Founded in 1990, it has become one of the biggest exporters of stone. It is one of the main players in China, has a total area of 350,000m^2 and more than 1500 employees (Xishi Group 2021).

Antolini	Founded in Verona in 1956, this Italian natural stone company has grown to include new quarries around the world to extend their offer in types of stones, and it has been at the forefront of developments in natural stone processing and new technologies (Antolini s.d.).

Other international Players:

Temmer Marble Tekma Pakistan Onyx Marble Dimpomar Mumal Marbles Can Simsekler Construction Mármoles Marín S.A. Aurangzeb Marble Industry	Etgran Amso International Universal Marble & Granite Best Cheer Stone Group Fujian Fengshan Stone Group Xiamen Wanlistone stock Kangli Stone Group Hongfa	Xishi Group Jin Long Run Yu Xinpengfei Industry Jinbo Construction Group Fujian Dongsheng Stone Guanghui

3 Macroeconomic Analysis

3.1 PESTEL Analysis

Political: The Republic of Portugal has an executive president who is elected by universal suffrage for a renewable term of five years and appoints the prime minister. Legislative authority is vested in the unicameral Assembly of the Republic, whose 230 members are elected by universal suffrage to serve four-year terms. Currently, the Socialist Party leads a minority government.

Portugal is still affected by high levels of private and public debt, weak bank profitability, limited access of corporations to credit, high levels of unemployment, and bottlenecks in key industries. Moreover, the budget deficit equalled 0.2% in 2019 and in 2020 the deficit is expected to reach 7.1% of GDP, as a result of COVID-19 related spending, and lower revenue caused by the slowdown in economic activity. Public debt grew to €247.451 m in 2019, equivalent to 117% of GDP, but is projected to decline to around 103% of GDP by 2023. In 2019, government expenditure on social security and welfare absorbed 39.4% of the total, followed by expenditure on general public services (16.8%) (Passport).

Economical: The Portuguese economy is experiencing a steep recession in 2020. Real GDP will fall by 9.2% in 2020 after gains of 2.2% in 2019. Real GDP in quarter-on-quarter terms fell by 3.9% in the first quarter of 2020 in seasonally adjusted terms, and by 13.9% in the second quarter, as a result of the COVID-19 crisis.

The Portuguese economy is mainly driven by the service sector that represents 74% of GDP. However, the sector has been hard-hit by measures to contain the pandemic. On the other hand, the share of agriculture in GDP has been falling for several decades. The sector employs 5.7% of the workforce and Portuguese farmers are the poorest in the EU.

Tourism accounts for roughly 10% of employment. Yet foreign tourism, which accounted for 52% of Portugal's exports of services in 2019, plunged by more than 90% in the second quarter of 2020. The real value of inbound tourism and business travel receipts rose by 8.7% in 2019 and since tourism was the hardest hit sector by the pandemic, a fall of 42.7% is expected in 2020.

In the banking sector, capital ratios have increased while the stock of non-performing loans has fallen. Nevertheless, banks continue to struggle owing to the large debts of the corporate sector. Access to credit continues to be difficult for small and medium-sized enterprises and start-ups.

Manufacturing makes up 14.9% of GDP and employs 18.1% of the workforce. In the past, the country’s manufacturers have survived on account of low wages. However, industries such as clothing and footwear increasingly face stiff competition from Asian countries where wages are lower.

Exports account for a modest but growing proportion of GDP. In 2019, the share of exports in GDP was 28.1%. The real value of private final consumption rose by 2.4% in 2019 and a fall of 7.7% is expected in 2020. Consumer spending is being delayed by the measures in place to contain COVID-19 but should recover in 2021 (Passport).

Social: The Portuguese population was 10.8 million in 2019. The total number has been gradually rising but is expected to decline in the future. By 2030, the population will be down to 9.9 million. The median age was 45.2 years in 2019 – slightly higher than the regional average. By 2030, this indicator will reach 49.4 years, the highest in Western Europe (World Bank).

Fertility has fallen to just 1.4 births per female in 2019 – well below both the replacement level and the regional average. As a result, people older than 65 years are expected to account for almost 27% of the total population by 2030. With fewer workers and taxpayers being born, the Portuguese could face accelerated fiscal pressure to provide for their ageing population.

Savings amounted to 7.1% of disposable income in 2019 and the ratio will increase to 7.2% in 2020. Consumer expenditure per capita was 14 124€ in 2019. In 2020, the indicator will fall by 8.2% in real terms. Health goods and medical services will be the fastest-growing consumer category in 2020-2030 followed by housing.

Technological: The actual economic and start-up ecosystem in Portugal has created great potential in the industries of Information and Communications Technology. As a result, in the last few years, Portugal has been gaining a good position worldwide concerning the ICT development index.

Moreover, Portugal has been the nest for some high-tech innovations: examples are the Multibanco network, one of the most sophisticated banking networks in the world; Via Verde, the first closed system of automatic highway tolls in the world; and the Pre-Paid Mobile Phones. Portugal is also one of the European countries with the highest FTTH penetration, all 46% of households, and has been at the forefront of the 3G and 4G infrastructure investment (Passport). From financial services to software, hardware, and telecommunications, Portuguese companies have achieved a high level of excellence and international recognition.

Environmental: The principal environmental agencies in Portugal include the Ministry of Quality of Life and the Office of the Secretary of State for the Environment. Air and water pollution are significant environmental problems, especially in Portugal's urban centres. The nation's water supply, especially in coastal areas, is threatened by pollutants from the oil and cellulose industries. Portugal has 37 cubic kilometres of renewable water, of which 53% is used to support farming and 40% is for industrial activity. In total, the nation's cities produce an average of 2.6 million tons of solid waste. The nation's wildlife and agricultural activities are threatened by erosion and desertification of the land.

Legal: Portugal has a code-based civil law justice system, and its judiciary is divided between civil and administrative courts. The civil courts are structured in a hierarchy. The lowest level civil court is the District Court (the *Tribunal Judicial de Comarca*), which is subordinate to the Appellate Court (the *Tribunal da Relação*), which is subordinate to the Superior Court of Justice (the *Superior Tribunal de Justiça*). In 2019 Portugal ranked 30th (out of 180 countries) for transparency, according to the Corruption Perception Index, with a score of 62/100.

In the last few years, **new legislation** was introduced by the Portuguese government enabling people who worked at quarries and warehouses for more than 30 years to retire early. Consequently, DP has lost some of its more experienced workers and, as a result, decided to shut down its last operative quarry.

3.2 Covid-19 Implications

The Covid-19 pandemic has impacted almost every industry and the extent of this disruption is still unknown. The construction materials industry where the natural stones are integrated is no exception. Throughout the value chain, substantial changes were identified.

In the quarries, due to lockdowns the production had to **be shut down** until orders from the governments indicated otherwise. By being closed for several months, the production suffered

a decrease of approximately 42% (McKinsey & Company s.d.). Transportation and infrastructure-related companies also had to close or delay their deliveries leading to an estimated increase in operational costs of approximately 16% (McKinsey & Company s.d.).

The COVID-19 crisis also had a very noticeable impact on family incomes, whose **purchasing power has been decreasing**. However, as a response to the COVID-19 crisis, about 750 000 employees benefited from various temporary forms of state support. Consequently, the unemployment rate increased only moderately from 6.5% in 2019 to around 7.4% in 2020 (King 2020). Many of the job cuts are likely to be temporary, but the expected slow recovery in tourism and related services is likely to harm labour demand over a longer period.

With expectations of a near-future crisis, both supply and demand have been experiencing major **disruptions in final product deliv**ery, mainly due to a reduction in demand and downstream consumption. To adapt to this new reality, companies within the construction materials industry have been reducing their planned production for 2020 by about 30% (McKinsey & Company s.d.). Also, companies have been **cancelling or delaying investments** such as expansions to avoid an increase in capital costs.

4 CSF Industry Analysis

4.1 CSF Industry Overview

In this industry, there are players focused on the discovery and exploration of the natural stone, others more focused on the processing of the natural stone, as well as players focused on both ends of the supply chain.

As a natural resource, the stone has various characteristics such as durability, rigidity, lifespan, and corrosion resistance, cracking, peeling, and chipping. All these characteristics have made the product ideal for various uses, such as kitchen counters, decoration, paving, landscaping, roofing, among others. Furthermore, it is attractive for its usefulness, comfort, and trendiness.

Natural Resources do not present themselves in the same shapes and forms. In the case of natural stones, blocks present different vein patterns, and the amount of waste from one to another may also change (from 30% waste to 80%). As such, knowledge is key to convey the most profitability possible out of the natural resource and to reduce the risk of incurring additional costs.

The industry tends to **fluctuate alongside the purchasing power** of customers. Furthermore, although some types of stone have a stable long-term demand such as black granites, white crystalline marbles, beige limestones (Grand View Research 2020), others fluctuate alongside design trends and geographical areas. The regulation applied by the governments regarding the exploration of natural resources comes to affect the profitability of the industry.

4.1.1 Market Valuation

The global natural stone market size was valued at approximately **€28.61 bn in 2018** and was projected to grow at a CAGR of **3.9%** (Covid-19 was not taken into account in this prevision) (Allied Market Research 2019).

The natural stone industry is about 5-7% the size of the ceramic industry, making it in comparison a niche market. Moreover, according to Anil Taneja (Taneja 2019), director of the World Natural Stone Association, the industry in the last decades has lost most of its profitability and needs to reinvent itself. For him, the key topics to address are the significant changes in marketing and promotion, with the increasing presence of social media and the digital world; the new role of designers that need to develop new attractive products, blending tradition with modernity; and, finally, the high presence of wastage and how to recycle them.

4.1.2 Trends & Forecast

Starting with **trends**, the market has been majorly driven by infrastructure construction activities, which include building roads, bridges, airports, power plants, and notably highway & road projects. However, in the last years, there has been an increase in the need for **residential & commercial** infrastructure setup, and in 2019 the residential application segment led the market and accounted for more than 56% of the global revenue share in 2019 (GlobeNewswire s.d.).

Major companies are adopting marketing strategies, such as **M&A and partnerships**, to strengthen their market positions, as well as increasing their geographic presence to gain a competitive advantage.

The newest trend in the natural stone industry is the pursuit of finished products with a **higher added value**, **eco-sustainable**, and with a **low environmental impact** throughout the entire life cycle of products. Nevertheless, only a few companies have specialized departments in R&D for the design and creation of new products.

Manufacturers are also integrating themselves with graphic studios that aid in the development of new graphics to produce more aesthetically appealing stone slabs. During 2018 **quartz and porcelain** took away a major share in many markets around the world. In the US where quartz and new alternative materials have met with the biggest success, but they have also replaced natural stone in many other high-income countries. Nevertheless, granite, marble and stone are forecast to grow at over 3.5% and reach a market size of 23 trillion metric tons (Globe Newswire s.d.).

In a survey conducted by the *Clear Seas Research Department at BNP Media* (Richinelli 2019), where they polled fabricators from diverse-sized shops based throughout the U.S., 31% of the polled producers reported aggregate sales increases of 10% or more in 2019. Sales were up 5

to 10% for another 31% of producers in 2019, while only 10% of producers report that their sales were up less than 5%.

Even with the increase in sales, fabricators were planning to have more spending cuts compared to years past. The most mentioned areas were marketing (32%), stock (32%), equipment (32%), personnel (26%), facilities (24%), warehousing (21%) and showroom (18%) (see Appendix 17 below).

Regarding the **forecast**, as explained before, "the global natural stone slab market size was valued at €28.69 bn in 2018 and is expected to grow at a compound annual growth rate (CAGR) of 3.5% from 2020 to 2027" (Allied Market Research 2019). Urbanization has increased considerably over the last decade and is anticipated to continue to increase during the forecast period, which is expected to offer lucrative growth opportunities for the natural stone market growth.

The urban population growth is concentrated in **emerging economies** of the world, which makes natural stones crucial, as these regions witness significant infrastructural development. This expansion of the residential and commercial construction sectors coupled with the increasing restructuring activities across the globe is anticipated to benefit the market growth.

Moreover, the increasing demand for the product in the construction of arches, walls, dams, abutments, and other structures is anticipated to also promote the market. In addition, properties, such as superior strength, high functionality, and durability, offered by natural stone slabs are likely to further propel the industry growth.

In 2019, **the Asia Pacific** dominated the market and accounted for over 36% of the global revenue (Grand View Research 2020). The region is expected to retain its dominant position registering the fastest growth rate over the next years. This growth can be attributed to the rapid expansion of the residential and non-residential construction sectors. Besides, increasing

spending capacity among the individuals in economies like China, but also India, South Korea, Indonesia, and others, is likely to drive the construction sector, thereby supporting industry growth.

At the same time, the increasing rehabilitation activities of the existing infrastructures in developed economies like the U.S., Germany, the U.K., Spain, and several others are also fueling the industry growth. Besides, in the **developed countries** the increasing average age of the houses is likely to propel the demand for renovations, thereby benefiting the industry growth.

In the *BNP Media* survey mentioned before, 82% of the respondents expect business to continue to grow over the next 5 to 10 years by an average of 24% (see Appendix 18 below). They believe that the stone market sales revenue will continue to increase in the future due to the increase in demand for the product. “People are building more custom homes and using real stone instead of laminate or other products,” said one fabricator. “There has been a demand in natural products – especially for aesthetic finishes,” said another person.

4.2 Porter’s Five Forces

Porter's Five Forces is a business analysis model created by Harvard Business School professor, Michael E. Porter and identifies an industry structure by determining its’ weakness and strengths. This model analyses five competitive forces that shape the industry and is extremely useful to give an overall perspective of the market by measuring competition intensity, attractiveness, and profitability of an industry (Investopedia 2020).

An analysis with Porter’s Five Forces supports identifying risks and opportunities in the industry. The industry considered is the **CSF Stone worldwide industry**. Note that, by natural stone, it is being referred to the ones that are extracted from the quarry.

4.2.1 Threat of Substitutes

The products are mainly used in commercial construction applications to build stronger, durable, and aesthetically pleasing structures. However, due to the high variety of materials that can work as substitutes (brick, ceramic, glass, plastic, steel, etc.) and the high number of suppliers around the world, the market is saturated with products.

Being the supply higher than the demand, it is easy and cheap to switch between products and suppliers. Fashion trends and prices are the main factors that can influence customers' decision making in choosing the kind of materials.

In the last few years, a new threat has risen. Thanks to technological advancements, artificial stones can emulate all the characteristics of natural stones and are now way more present in the market. The product was introduced in the market as an answer to the demand for more consistency and uniformity in the look of the finished product. Due to their light-weight nature, artificial stones are much easier and less expensive to cut and manage, when compared to real ones.

Finally, thanks to the reduction in wastage and the less impactful process of extraction, artificial stones are more environmentally friendly (Luru 2019). In conclusion, in the natural stone industry, there is a relatively **high** threat from substitutes.

4.2.2 Threat of New entrants

High initial capital investment and compliance with environmental regulations are barriers to entry (IfM- Cambridge University 2020). However, this can be easily offset by low manufacturing costs and the government incentives in developing economies, that have been growing substantially and were complying with environmental law is not a concern (Cosi 2015). With little bureaucracy, little safety legal requirements and low control, the entrance of these

far east countries (e.g. China, India, Taiwan, Indonesia) are forming strong new markets in emerging global economies.

In Southeast Asia, there are two main ongoing trends: existing companies that continue growing and new players entering the market looking for projects both in Asia and around the world.

Many natural stone producers have been expanding their international footprint as a way of gaining market share and broader their product portfolio. Agreements and formal partnerships (e.g. M&A) are facilitating the acquisition of foreign quarries as well as showrooms and galleries increasing international exposure. (Allied Market Research 2020)

Also, new entrants have been taking advantage of product development and R&D, adopting new methods in the exploration and operation of the quarries. While developed countries are using top production technologies to offset their high labour costs, developing economies such as Brazil, China and India have been developing their own manufacturing equipment over the past 20 years. The main outcome is an easy start-up and development of new quarries around the world.

Lastly, many quarries that used to be only a source of raw material are now forward integrating and becoming producers themselves. This new type of entrants benefits from absolute cost advantages and can have lower prices. Concluding, barriers to entry are low and the threat of new entrants is **medium-high**.

4.2.3 Bargaining power of suppliers

In this industry, a supplier is commonly an owner of a quarry that is actively exploring, selling, and trading blocks. Having a wide range of natural stone offerings is an important competitive advantage within this industry. As such, although there is a considerable number of suppliers, an active player within the market who acknowledges the impact of inputs differentiation is expected to have more than one supplier to meet its needs.

Loyalty and having open channels of communication with suppliers are highly valued and characteristic of this industry. Players need to secure a continued supply of both high and low quantities of various types of material. Furthermore, the waste of natural stone blocks can range from 30% to 80% which makes trustworthiness in the supplier and the quality of the delivered block highly important.

There is a high threat of forwarding integration within this industry, and when suppliers start moving throughout the supply chain, they can offer competitive prices when compared with current players.

Finally, one may say players have moderate switching costs. Although companies can easily find new suppliers, building a relationship with them is very consuming. To conclude, we may find **medium-high** supplier power in the CSF stone industry.

4.2.4 Bargaining power of buyers

In the natural stone industry, the number of buyers is limited and big construction wholesalers and construction companies are important players. Their orders represent big quantities, and their value is very high, giving them the power to negotiate prices. The wholesalers have also a unique capacity to control distribution channels and the display of the products which has an important factor in sales.

In addition, given the high number of suppliers and substitute products, the switching costs for the buyers are reduced, representing a threat for natural stone companies that must differentiate in quality while maintaining competitive prices. Given this information, one may classify the bargaining power of buyers in the Natural Stone Industry as **high.**

4.2.5 Competitive Rivalry

This market is highly competitive with numerous competitors such as Polycor Inc (Polycor INC 2020), Margraf and DP. In this specific industry, companies can only differentiate themselves on price or quality.

As aforementioned, there are two types of companies, the ones that began as quarries and started selling directly to end customers or distributors, and the enterprises that rely on quarries to get their raw materials and differentiate themselves through their experience as DP does.

Manufacturers have entered with new generation ceramics in Spain, Italy, India, China, and Turkey. These compete on the same market as natural stone, therefore increasing the market size. Artificial stone can be seen as less elegant than natural stone and even though its' price is similar to that of natural stone, high investments in marketing and technology can lead to increased competition in the forthcoming years.

Brand identity is indeed necessary to remain attractive and differentiate from the other players in the industry. Furthermore, there are little or even no switching costs for the consumers, making the market more competitive as companies need to build real and strong relations to keep their clients' loyalty. To conclude, the intensity of competition in this market is **high**.

Five Porter analysis conclusion: All in all, DP operates in a **competitive industry with many experienced companies.** This makes it unattractive to enter, and it also means that a competitive advantage for incumbents is extremely important. Since buyers generally have high power firms need to be very careful with their customers in order not to lose them.

The biggest problem this industry is facing is the threat of substitutes since the artificial stone demand is growing. The medium-high power of suppliers indicates that to strive in this industry it is necessary to build a strong and lasting relationship with the suppliers. In summary, it is a

tough industry to compete in and companies need a good competitive advantage and a good customer network.

4.3 Key Industry Success Factors

Industry Key Success Factors are the areas of a company carrying critical performance that will make it succeed in the Natural Stone Industry. The following components have been determined as key success factors based on the previous analysis of the CSF industry.

First, it is vital to have specific **knowledge** on stone and its' respective processes, gained through **experience** in the industry. This will allow players to select the best stones to later sell in their companies. Also, it enables to offer clients the most appropriate stones according to the functionalities and purpose they are looking for.

Secondly, an **efficient stone selection** is extremely important to avoid extracting stones with high waste percentages and consequently having to buy more stone. Stone blocks are very costly and usually represent a big chunk of companies' expenses. As such, to be capable of selecting good blocks greatly reduces costs and increases profit.

Likewise, having **efficient operational processes** is also a key industry success factor. This means efficacy in CSF stone through innovative processes, tools and machines enabling fewer timings and defect rates. As a result, companies will be able to cut, shape, and finish the stone and deliver it to clients in less time as well as when compared to competitors they can produce more quantity in less time.

Prosperous contact networks are also crucial in the CSF industry and complement the other mentioned key success factors. This includes having strong and wide supply (e.g. stone quarries) and distribution chain but also a large network of clients. For instance, risk can be diversified through geographically diverse customer bases.

Finally, **product portfolio variety** and **quality control** are two essential factors desired by clients. In this industry, clients enjoy having a wide range of stone alternatives they can evaluate and choose according to their preferences and purposes. Also, customers look for a quality stone with companies responsible for guaranteeing it to them. This implies controlling quality through the several stages of the supply chain they incur in.

5 Country & Firm-Specific Advantages

5.1 Home Country Business Environment - Porter's Diamond

Factor conditions: As a member of the European Union, Portugal can benefit from trade agreements which facilitate imports and exports with other member countries. Moreover, transportation efficiencies are derived from its quality ports and closeness to the Atlantic Ocean. The minimum wage is rather low (€635.00 (Pordata s.d.)) when compared to other European countries. With a high school enrolment in secondary education percentage net (~95% (The World Bank s.d.)), companies may find in Portugal skilled labour at low cost.

When analysing the different lithologies of the Portuguese territory (RTP Ensina s.d.), one may note a wide variety of natural stone. In the North and Centre of Portugal the predominant stones are from a magmatic origin (e.g. Granite) and metamorphic (e.g. schists, marbles, quartzites and gneisses). In the South and Centre of Portugal sedimentary (e.g. such as sands, sandstones, clays, conglomerates, limestones, and marl) and metamorphic stones are more common. In contrast, one may find volcanic stones in the archipelagos of Açores and Madeira, namely basalt. Concluding, the advantages in Portugal are **high**.

Demand conditions: Industry Revenue in Portugal is predicted to reach € 535 919 200 by 2021 and € 540 322 600 by 2023. Furthermore, the industry is expected to grow by 0.45% from 2020 to 2021 (Statista 2017). In comparison, the Industry Revenue in Italy is expected to be € 2 568

240 000 by 2021, € 3 707 531 600 by 2023, and an expected growth rate of 5.88% from 2020 to 2021 (Statista 2017). Thus, the advantage in Portugal is **medium**.

Related and Supporting Industries: Dealing with a natural resource, stone suppliers are dependent on the lithologies of the countries in which they operate. As such, trading of blocks and slabs is very common amongst the players of the industry, ensuring portfolio diversity. Furthermore, tight, and long-term relationships with stone suppliers ensure diminishing waste rates, as well as stable supplies of stone.

Besides, Portuguese associations such as Assimagra (Assimagra s.d.) support Natural Stone companies locally while helping them to internationalize and expand their business through the organization of projects and by sharing their knowledge on the industry. Although associations are quite organized in this industry, the market of natural stone suppliers is saturated, leading to a **medium** advantage of relating and supporting industries.

Firm Strategy, Structure, and Rivalry: As previously discussed, domestic rivalry in this industry is nowadays marked by stone suppliers with quarries which start their own business within the CSF stone industry. In Portugal, the market is at its' maturity, showing high rivalry, which is in turn pushing businesses towards innovation.

DP pursues an international strategy, doing business with various markets. By having a big portfolio, following a differentiation strategy, and offering clients excellence products, the company assures competitive advantages when competing domestically. In conclusion, the advantage in Portugal is **high**.

Government: A share of the European Union Funds was attributed to DP in the value of € 513 260.86 (Total Approved Funding) (Portugal2020 s.d.). This fund will be exercised from 01/09/2019 to 31/08/2021 and aims to support the competitiveness of small and medium companies, ensuring better productivity, intelligent processes, and better exploration of natural

resources. Concluding, the advantages of doing business in this industry in Portugal are **medium**.

Chance: With the Covid-19's pandemic, the Portuguese unemployment rate has increased, and various outcomes are yet to be seen. Nevertheless, according to the last monthly report issued by Assimagra, exports within this industry are close to reaching the point of 2018, representing over €270 m (Assimagra 2020). Hence, the advantage of chance is **medium**.

5.2 Firm-Specific Advantages

5.2.1 Company Resources and Capabilities

Following the work of Grant (2010, 127), first, it is important to grasp the company's resources and capabilities to understand how these relate amongst themselves and result in company competitive advantages. (see Appendix 32 below)

Resources are the assets owned by the company and can be divided into three main categories. DP's tangible resources are cash (along with having a high solvency ratio, an intangible resource), CSF facilities and a stone quarries, truck, containers, other equipment and machinery, and raw materials such as stone and wood. Intangible resources are the internal software and databases, brand name and company reputation, customer trust and loyalty, supply and distribution international networks, and its' culture of a familiar business that maintains close and prolonged relationships with clients. Finally, human resources are employees' skills and experience, along with specific industry know-how. (see Appendix 33 below)

Capabilities of a company are collective skills, abilities, and expertise of an organization necessary to operate and execute the strategy designed itself. DP capabilities start with stone selection, where the best blocks are chosen to avoid waste and provide clients with good quality stone.

Next, it cuts, shapes, resizes and polishes blocks, slabs and tiles, but also packages the stone in homemade wooden boxes, storages and later transports them to the harbor enabling efficient and safe loadings. As so, DP carries material management capabilities and manufacturing capabilities on supply-chain management, production scheduling assembly, quality-control procedures, and inventory control.

Besides, DP is further capable to control stone quality throughout the whole supply chain, from stone extraction to final client delivery. Moreover, the company is able to offer a wide product portfolio with different stone categories from multiple regions. (see Appendix 34 below)

Finally, DP has a clear and strong knowledge of translucency, mechanical properties, vein-matching, and cutting-direction. They also acquired experience in special fabrication processes like Honeycomb, Stork (stone & cork), Ceramic-base.

5.2.2 Company Competitive Advantages

Following the rational set by Grant (2010, 135-138), resources and capabilities will be evaluated on their relevance, scarcity, non-transferability, non-replicability, and durability. If they check the first two criteria, they will give DP a temporary advantage, however, if all criteria apply then sustainable competitive advantaged is granted.

	Relevant	Scarcity	Non-Transferability	Non-Replicability	Durability	Results
Resources						
Cash (high solvency ratio)	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
CSF facilities, Stone quarry	Yes	No	-	-	-	Parity
Equipment and machinery	Yes	No	-	-	-	Parity
Raw materials	Yes	Yes	No	No	Yes	Temporary Competitive Advantage
Internal software and database	Yes	No	-	-	-	Parity
Brand name and reputation	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Customer trust and loyalty	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Vast and Strong International Network	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Culture (close and continued relation with clients)	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Employees' know-how and experience	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Capabilities						
Product Portfolio Variety	Yes	Yes	Yes	No	Yes	Temporary Competitive Advantage
Packaging, storage and transportation	Yes	No	-	-	-	Parity
Efficient operational processes	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Effective stone selection	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Quality control throughout the value chain	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage

Raw materials such as stone and product portfolio variety can allow DP to establish a **temporary competitive advantage** but not sustain it. However, there are sources DP holds that grant **sustainable competitive advantage**.

The company has the right people with diversified skills. Both expertise in natural stones' unique characteristics and special fabrication processes is ensured by experienced craftsmen working there for over 30 years, and by a younger crew working with industry 4.0. This, along with investments made in top technology and machinery, translates into superior efficiency and CSF capacity and answering to clients' requests more accurately through the use of innovative techniques. For instance, DP not only imports but also cuts, shapes, and finishes stone from foreign countries because it is more efficient in it than the countries' companies.

Likewise, with experience to minimize wastage percentages and identify top-quality blocks, DP also benefits from a sustainable competitive advantage in its stone selection processes and ability to control quality throughout all phases of the supply channel.

Strong and vast international networks resulted from 40 years of market presence building credible long-term relationships with stakeholders from all around the world. *Customer trust and loyalty* were gained by following a direct approach with clients where close and lasting relationships are part of its' *culture*. This, together with DP's experience in stone sourcing and CSF, makes it one of the worldwide leading players and well-known brand name in the Natural Stone Business with a *reputation* for high reliability on the quality services it provides. All these aspects give DP a sustainable competitive advantage.

Finally, having a high (asset-based) *solvency ratio* grants a sustainable competitive advantage by increasing the leverage DP has on negotiations with suppliers and customers.

5.2.3 TOWS

Having performed a SWOT analysis (see Appendix 20 below) the team was able to integrate its findings into a TOWS analysis (see Appendix 21 below) to assess comprehensively the external factors and internal factors. These factors helped determined both the competitive position of DP and potential growth for the company.

Using Strengths to maximize opportunities: By using the know-how provided by several years of experience within the industry, DP could engage in R&D initiatives, exploring quarries and developing new partnerships. The know-how would give DP an edge in engaging in R&D initiatives related to the raw material. Although DP is already developing cut-to-size products that use wasted material, other players in the industry are transforming the raw material turning it into partly engineered stone or finding alternative uses for natural stone. With the help of partnerships with universities, DP could distinguish itself from other players and compete in developing markets such as synthetic stone industry.

Moreover, DP's know-how and further learning economies could be a determinant factor in efficiently exploring quarries. The backward integration would allow DP to sell blocks and slabs at competing prices to other companies and have greater control over their costs. Being know-how such a valuable resource in this industry, DP could use it to establish relevant partnerships with construction companies, which would give them more secured prospect sales and financial stability.

Furthermore, the know-how, along with the control of various stages of the supply chain, can help DP to expand its international presence through partnerships and other internationalization strategies, building new access to other markets. Finally, the large range of product portfolio, provided by long and healthy relationships with clients and suppliers abroad, fights companies that are globally threatening the industry.

Using Strengths to Minimize Threats: The competitive advantage of their established and trustworthy business international relations can be used to minimize the threat of engineered stone companies and quarries that have recently started their businesses.

Minimize Weaknesses by Taking Advantages of Opportunities: By working on a clear communication strategy, as well as an acquisition strategy of clients and partners, DP can take advantage of some external opportunities it faces. Firstly, the associations to which DP belongs work as efficient channels of communication with both potential clients, suppliers, and other players within the industry. By establishing a clear strategy to attain customers, DP could make better use of those channels as well as explore new associations that would open new opportunities in different markets.

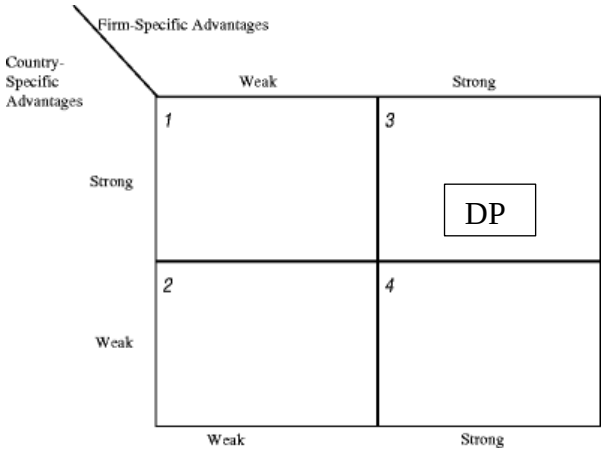
Secondly, by drafting a proper strategy to capture the segments that DP wants to target, the company can profit from having a wider range of clients whom they know how to attract and engage. Thirdly, by working on a communication strategy, DP can take advantage of new partnerships that bring more stable and high-volume sales, ensuring their financial stability.

Minimizing Weaknesses and Avoiding Threats: DP can minimize its' weaknesses and avoid current threats as it is the case of engineered stone companies and quarries that started their own business. By carefully drafting a strategy for communication and capturing clients, DP can position through its' points of differentiation within the market. This would enable the company to distance itself from these threats, fighting for a niche position within the industry. On the other hand, DP can also draft those new strategies in a way to face and compete alongside those players.

5.2.4 FSA-CSA Matrix

As explained before, DP benefits from both firm and country-specific advantages. However, while the firm-specific advantages, thanks to DP's decades of experience and presence on the

market, are strong and established, the country-specific advantages depend mainly on the relevance of the Portuguese stones in the global market. Since the demand for Portuguese marble has risen in recent times, the group decided to collocate DP in the third quadrant however, this position could change towards the fourth quadrant in the future.



6 Global Readiness

6.1 Internal Drivers: Motives to Internationalize

Since its early days, DP has always had an **international vision and presence**. In 1984, DP was already exporting stones for four clients in three different countries. Today, it has projects over the five continents, exporting to more than forty countries. Currently, close to 80% of the sales are made to international customers being the US, China and the United Kingdom their top three international markets (see Appendix 23 below). The remaining 20% are made to Portuguese clients through its DP.1 office. In the past, the percentage was even higher with 90% of the revenues coming from international clients.

DP's supply chain goes beyond the Portuguese quarries with suppliers of stones from fifteen countries. In fact, for DP, building relationships with players from all over the world has always been a key action to **extend its' stone portfolio**, to **find new clients,** and **enter new markets.**

In the last years, natural stone companies as DP have been facing **difficult moments** (see Appendix 17 below) accentuated by the Covid-19 pandemic that caused a delay in multiple projects launchings. The decline in profit registered over the last years depends also on the company's **fewer sales in Portugal**. Hence, DP sees further internalization as a way to offset this situation, believing it will **increase sales and efficiency** by using its factory available production capacity.

However, the change in the management provided by the introduction of a new CEO has pushed the company's strategy even more towards internationalization and has caused a shift in DP's strategy. The company has decided to focus less on finding new partnerships with companies that own quarries to extend their portfolio, and instead, they want to rely on stronger and more comprehensive networks by increasing their partnership with the main actors of the value chain of the construction industry. As a result, DP will be able to rely less on a reactive approach and shift to a more proactive one.

6.2 Global Readiness Assessment

DP has already proved its understanding of customer needs in multiple countries, as shown by the sales in the United Kingdom, China and the US, respectively 26.63%, 18.51% and 8.7% of the total sales. Besides comfortably playing in international markets, it is a financially healthy company. As such, DP is ready to further expand its' international presence worldwide and strengthen resource commitment by adopting new possible entry modes.

Nevertheless, to assure a successful internationalization plan, DP will have to follow a clear path and focus on four groups of capabilities. The first one is "**Leadership and Governance**". DP's new CEO carries a strong leadership that can be seen through the complex changes that she implemented and that were necessary. For instance, a high number of international stones was added to the portfolio, allowing DP to answer to a broader demand for stones. However,

since this change in governance is recent it is key to align stakeholders' minds towards the same goal. This will reduce the risk of losing key partners that could jeopardize the entire process.

The next one is "**Business capabilities**". DP holds powerful technical and production capabilities. As explained before, DP detains a clear and strong understanding of the stone and mechanical properties. At the same time, the company has mastered the main technical skills needed in this industry, as well as owning state-of-the-art machines for the cut, shape and finish of stones.

The third group of capabilities regards "**Organisational and Executional alignment**", where DP is strong. Their primary focus has always been to offer the best product and experience to their customers. DP has succeeded by currently holding close and long-lasting client relationships. Additionally, by guaranteeing the quality of the "Cutting, Shaping and Finishing" of the stone, DP was able to position itself as a strong actor in the market.

Lastly, regarding "**Learning and Agility capabilities**", DP has forty years of experience in the Natural stone market with a strong and experienced board. In every industry, to be a key player for a long time is proof of company agility. To remain competitive against newcomers, a company always have to reassess its knowledge and operational processes.

7 Conclusions and Next Steps

An analysis of the company was conducted to understand DP's product and processes, but most importantly its' **competitive advantages** – employees with know-how and experience; efficient stone selection and CSF processes; quality control throughout the supply channels; Strong and vast international networks; the company culture, brand and reputation, customer trust and loyalty; and a high (asset-based) solvency ratio.

Moreover, drawing its business model allowed a holistic and detailed understanding of each segment of the business it runs. Joining this information with the one obtained from industry analysis hinted at **potential opportunities** DP can take advantage of by using its strengths.

However, some **urgencies** were also highlighted. Despite DP being a main player in the CSF industry, this industry has been suffering changes with the emergence of a new type of suppliers (e.g. ceramic stone) and increased use of mergers and acquisitions to create stronger and powerful companies (e.g. Polycor INC). Therefore, if DP wants to keep its market position and/or increase its presence, further actions must be taken.

Moreover, a saturated domestic market encouraged DP to look for new sources of revenues, namely international markets. In this sense, DP's **internalization readiness** was evaluated and confessed readiness to jump further in the worldwide trade. As such, multiple analyses will be made to find the best country for the internationalization process and the best strategy to enter it.

In the **next steps**, a geographical analysis will evaluate existing countries using qualitative and quantitative variables. The three top countries will be further analyzed through a market in-depth analysis. This consists of searching information on these countries and ranking them according to their attractiveness compared to DP value proposition and maturity.

Having done that, the best country or countries will be chosen, and an entry strategy and marketing plan will be drafted as well as a financial analysis to ensure the project is viable and that it will bring value to DP. For the entry strategy to be successful, the company will have to follow the different steps outlined along with the marketing actions associated.

Part G: Increasing International Footprint of Natural Stone Business – Final Remarks

1 Risk Assessment

The most plausible risks that can result from the internationalization plan, the impact they can have on the plans' success and possible actions that can predict or resolve these risks were identified. The table below illustrates this analysis.

Risk	Description	Suggested Action	Probability	Impact on the Plan
Planning Failures	Difficulty in estimate the time necessary for each phase of the plan.	It is important to define clear objectives in terms of revenues, number of projects and types of stones for strategic alliance to reach before moving to following phase. This way, it will be easier to understand when DP will be ready for each phase.	Medium	Medium
Difficulty in enstablishing contacts in foreign countries	Since in the industry loyalty and contacts are extremely important, the clients tend to stick with their current suppliers. In the beginning DP could have problems in winning the trust of the clients.	Thanks to decades of presence in the business, DP has already some contacts in the target countries. However, to expand their reach it is key to participate to fairs and to contact stone national associations.	Medium	High
Difficulty in finding qualified employees	Along the expansion plan DP will need to hire different new employees, with precise skills. It is possible that the selection problem could require an important amount of time.	It is possible that DP will have some problems in finding qualified personnel, especially for the sales representive in Australia that will need to be fluent in Portuguese. To minimize this possibility, is important to start the recruiting process in the first phase of the expansion plan, in order to have some time flexibility.	Low	High
Inability to find worth Strategic Alliances in Germany	After succeding in Australia, DP could have problems to replicate the same strategy in Germany due to the different maturity of the market.	It is possible that due to the German market being more mature, DP will have more difficult in making strategic alliances with local companies. In this case, DP will need the flexibility to be ready to shift and target other European market that could offer more opportunities.	Medium	Medium
Underestimation of the competitive environment	Due nature of the industry and recent trend for quarries to start working directly on the stones, the market could have a higher degree of competition than expected.	In case the Australian and Germany markets will turn out to be more competitive than expected, DP will need to be ready to offer better conditions in terms of prices and days to pay than the other competitors. Moreover, DP will need to invest in marketing strategies to underline the higher quality of their products.	Medium	High
Financial Risk	If to initiate and sustain the project DP will need a higher investment than planned.	DP, currently, has a really solid financial position. Moreover, the expansion plan will depend mainly on reinvesting profits, so that DP's finances will not be stressed. Nevertheless, DP could always wait before moving from one phase to the next, to delay the expenses; or could change the ratio between equity and debt, and ask for a bigger loan.	Low	Medium

2 Main Limitations

Reaching the end of the internationalization project for DP, it is now possible to get an overview of the limitations underlined in the processes and methodologies executed.

Over the course of the project, the main limitations found were mostly due to the **lack of accurate and reliable information**. This limitation is related to the fact that the natural stone industry is considered very closed regarding information sharing. Looking for data on market size and market shares showed to be difficult at a global level and a country level. Also, finding the prices of the products from companies in the industry was extremely hard if not impossible given the secrecy surrounding the pricing strategies within natural stone companies, as they are

usually set by negotiation. The same limitations were found on information about the geographical footprint of the competitors.

To overcome the lack of information regarding the industry and DP's competitors, several assumptions were created based on data from previous years and by taking advantage of every piece of information gathered. A close relationship with DP was also particularly important when making those assumptions since the knowledge they shred was fundamental to understand the strengths of each hypothesis and assumption made. There are however other actions DP can take to overcome this situation, namely, to buy industry reports available online. However, when doing so it must be careful to only choose reliable sources.

Another limitation found during the process was the **lack of information about the company** due to inexistent or incomplete files. Although DP is in the process of informatization of all internal data, several databases and financial documents were still to be formatted. That led to the creation of extrapolations and assumptions when the information was not available, especially on sales and marketing efforts such as the list of sales breakdowns and the different prices practised by the company within different markets and types of products.

To help overcome this issue in the future, when automatizing its' data files DP should also implement a business intelligence software. By taking advantage of these types of data-driven tools, it will be able to combine the data it has available on multiple sources and analyse the information in a quicker and more visually appealing way. In addition, it will give the ability to analyse market trends, capture opportunities and optimize operations in real-time. This will also lead to the development of new strategies supported by data.

Still regarding DP's data systems, at a financial level, DP is recommended to implement an accounting system that allows for a continuous update of the financial information of the company. This way it will be easier to track the numbers of each operation and consequently

analyze profitability and efficiency. In addition, DP will be able to make its business decision based on financial data such as deciding if a certain type of stone is profitable or should be removed from the portfolio.

3 Recommendations and Future considerations

3.1 General Recommendations

After the implementation of the internationalization project, DP must keep adapting its business model to be successful in an everchanging market. Thus, two recommendation will be presented to help DP preparing for what is coming.

The first recommendation is to do a **continuous evaluation of the market**. To do so, DP must perform regular market analysis, not only at a country level but also globally to capture new market opportunities, threats, and trends. Additionally, DP must pay close attention to the customers in the market, by understanding if their needs are changing and finding ways to tackle them. Surveys, customer analysis and feedback collection should be performed regularly.

The second recommendation is to **keep updating and performing new sensitivity and scenario analysis** to each project DP undertakes. This step is especially important as it identifies the forecasts and assumptions that might incur in more risk to the company. DP should analyze the behaviour of the financial models' most problematic variables and the impact they have on the financial situation of the company. By doing so DP would gather a better understanding of the different scenarios and it would be able to prepare in advance strategies on how to overcome each one of those scenarios. The more prepared DP is, the better it will perform in the future.

3.2 Future Considerations: Given the Failure of the Internationalization Plan

Problem 1: The first problem that could arise in DP's expansion plan is the **failing of the strategic alliances** made with the local companies in Australia and Germany. Particularly, problems as a lack of commitment and few projects from the partners, different cultures and ways of working or mismatched expectations could arise. To prevent these DP must make sure to clarify the objectives and responsibilities with partners during the negotiations phase. It can also set joint KPIs for a clear understanding of the alliance's performance. Since Strategic Alliances are flexible contracts it is usually easy to terminate the relationship if necessary.

Another problem could be to face difficulties in handling partner company's' orders by lacking available production capacity or simply not being able to comply with timings set to produce and ship the products. In this case, DP should try to ensure active communication before and during the development of projects so the partner is aware of all the delays or problems that could emerge in the production.

Problem 2: Secondly, some problems might arise related to the **Sales Branch**. To prevent **discrepancies** with the parent company, DP should organize quarterly meetings with the branch and ensure alignment in objectives, global strategy, as well as in the value proposition.

Transportation inefficiencies might also arise such as late deliveries, missed shipments, or damaged goods. Such problems might damage DP's value proposition and brand reputation. Nevertheless, they might be tackled by re-organizing the contractual terms with transportation companies, doing partnerships with different shipping companies, improving the predictability of future orders by analysing client's history, or even require clients to order with more days in advance.

Furthermore, possible **trusting issues** could be tackled by planning occasional trips for DP's employees to Australia and ensuring personal contact. DP should consider dropping the Sales

Branch if none of the recommendations proves to be successful or changing the entry mode strategy in the case that the delivery standards are not adequate to a specific client segment.

Problem 3: Lastly, DP could find out that the **Australian market is less profitable than expected**. In this scenario, DP should try to re-adapt its strategy, focusing only on the clients and products that bring more revenues and stop selling to the others.

On top of that, DP should also re-analyze the market with the insights they have collected during the time spent in Australia in order to understand if there is the possibility to focus on different types of clients and products, that can have a better market in the country.

Finally, DP should delay the following phases of the expansion plan until the revenues improve or in the worst-case scenario, disinvest from Australia and focus to different countries.

3.3 Future Considerations: Given the Success of the Internationalization Plan

Consideration 1: The strategic alliances and sales representatives aim to increase footprint in Australia to be profitable. Having these two steps successfully launched, DP will move to the **acquisition of the CSF company**. The team gave a preview of the acquisition cost, nevertheless DP will have to execute a "Precedent transaction analysis". Specific information is available on "equity research reports", "Bloomberg", and "M&A Global". Three multiples often used in the evaluation of companies are EV/Revenue, EV/EBITDA, EV/Capital employed. These multiples will give a complete overview of the financial efficiency of the company.

Consideration 2: If the acquisition proves to be successful, DP can further consider **doing business with other Asian countries**. It can think of markets that are attractive to trade stone with such as China, South Korea, Singapore, Japan, New Zealand and Hong Kong. It can also consider geographically close countries, namely Papua New Guinea, Malaysia, Indonesia, Philippines and Vietnam.

To decide which country to choose, DP can follow the analysis done in this project: to gather data on variables that characterize the market's potential (e.g. demand on stone, GDP, etc.) and do a ranking and clustering analysis. If the trend remains, a possibility could be to do strategic alliances with companies in South Korea, a country that has proven to be attractive for DP.

Following the rationale of the entry strategy proposed for Australia, DP can opt by entering these countries through externalization entry modes and then increase resource commitment once market knowledge and experience is gained.

Consideration 3: Provided with a prosperous Internationalization Plan, DP could consider engaging on some of the **identified opportunities**, sustaining the longevity of its competitive advantage. Examples include: Engaging in R&D initiatives, facing the competition of artificial stone; Acquiring a quarry to diversify their product portfolio and control prices; Explore alternative use for their existing quarries; Make use of relationships with local stone associations to secure client and supply networks; Keep increasing its' international footprint and thus its' revenue; Proactively exploring new customer acquisition strategies; and Making more partnerships with clients, securing stable demand for their products.

4 Conclusions

The project was divided into seven different parts. After analyzing, in the first part, the situation analysis of both DP and the CSF Stone industry, it was concluded that the company shows readiness to internationalize.

In the second part, a ranking and clustering analysis was conducted using quantitative and qualitative variables. This highlighted potential countries DP could expand to, the top three being Australia, Germany, and South Korea. Afterwards, a market in-depth analysis on these three evaluated crucial factors to be considered when entering a market: country overview

through Pestel analysis, the intensity of competition, market revenue potential, contacts in the country and entry mode.

The Australian market is the one with the most expected growth in the future both in terms of market size and production turnover. Moreover, since the market is still developing the competition is less severe than the German and South Korean ones. On the other hand, since DP has already a small footprint in Germany, it is plausible that they will have fewer problems in finding clients, thanks to the contacts that they have made in the past. Yet, since the German CSF stone industry is much more mature, DP will need to comply with a higher level of competition. Appendix 36 summarizes the final scores for each country, with Australia, closely followed by Germany, proving to be the best countries to expand to.

Next, an expansion strategy was developed to extend DP's life cycle and guarantee its competitiveness in the CSF industry. DP will do so by raising international demand and revenues once its domestic market is saturated. A two-way entry strategy was then proposed: to first enter the Australian market and then the German one.

This outlines DP should change its approach to demand by embracing a more proactive attitude by going after client and project opportunities. It is also suggested to start engaging in contractual modes to guarantee annual demand levels and have sustainable growth over time. Finally, DP is left with the possibility of creating an Asian hub by extending production to Australia. Following an organic and sustainable path, it will be finally capable to answer demand orders from big countries such as China and South Korea.

A Marketing Plan was suggested with the purpose of optimally and sustainably drive DP's profitability. In that train of thought, several actions were recommended in line with DP's luxurious and premium offerings following proactive customer acquisition and retention strategies.

In the sixth part of the project, a Financial Plan was conducted where the financial viability of the project was analyzed in an operational, investment and financing level. At the end of the analysis, the project showed to be viable and sustainable not only in the short-term but also in a medium, long-term perspective.

To finalize the work, a risk assessment was performed to understand the which were the actions in the implementation plan what imply more risk to DP and its internationalization project. Thus, to complement the risk analysis, limitations, recommendations, and future considerations were presented to help DP minimize risks and maximize its success. The recommendations were separated in 3 parts. The first part contemplated general recommendations for DP, the second part presented considerations and recommendations in the case of specific implementations failures that might happen in the future. The last part presented recommendations and considerations for the future of DP's internationalization project, given the success of its implementation, as it is expected.

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6 Appendixes

Appendix 1. Human Resources Data

Distribution of Human Resources by Level of Training									
Personnel	< = Level 3			Level 4			Level 6		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Men	65	64	58	2	3	3	4	3	3
Women	9	7	10				3	3	3
Total	74	71	68	2	3	3	7	6	6

Personnel	Total		
	2017	2018	2019
Men	71	70	64
Women	12	10	13
Total	83	80	77

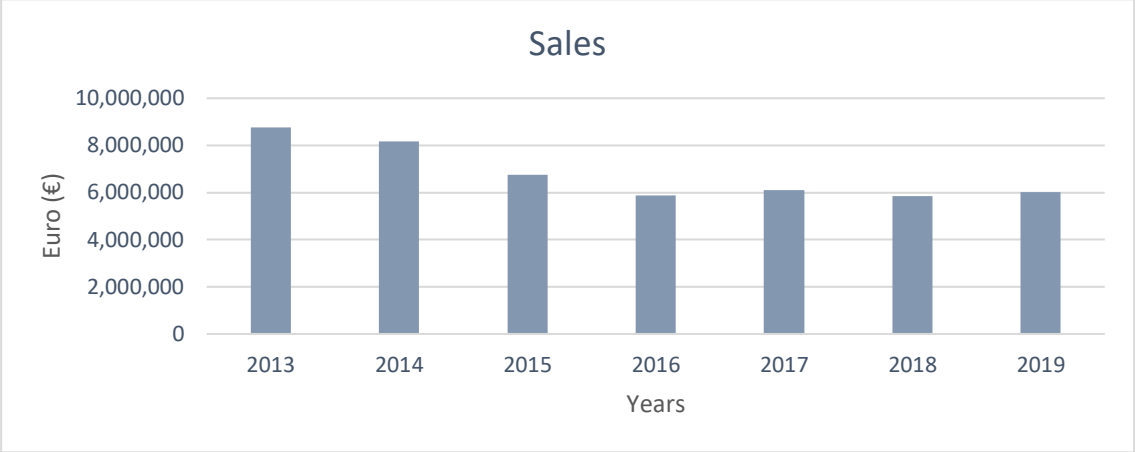
Appendix 2. DP Financial Statements

Profit & Loss Account			
REVENUES AND EXPENSES	Periods		
	2019	2018	2017
Sales	6,018,037.48	5,835,688.25	6,109,894.72
Operating grants	405	3,683.05	3,391.01
Inventories of production change	-129,033.32	-16,420.94	95,086.93
Cost of goods sold (and consumed)	-3,243,296.01	-2,908,955.46	-2,872,750.03
External supplies and services	-1,057,704.36	-1,092,812.13	-1,237,147.82
Employees expenses	-1,623,733.32	-1,644,998.73	-1,656,108.30
Impairment of debts (losses/reversions)	4,012.35	-13,989.99	
Fair value Increase/Decrease	152,392.14	-144,731.05	35,495.86
Other revenues and gains	371,281.66	443,805.20	278,885.76
Other expenses and losses	-35,477.03	-74,164.86	-491,842.19
EBITDA	**456,884.59**	**387,103.34**	**264,905.94**
Expenses/reversions of depreciation and amortisation	-299,717.24	-250,674.52	-284,234.97
EBIT	**157,167.35**	**136,428.82**	**-19,329.03**
			-0.57
Result before taxes	**157,167.35**	**136,428.82**	**-19,329.60**
Income tax for the period	-35,477.69	-34,893.67	-46,045.49
Net result for the period	**121,689.66**	**101,535.15**	**-65,375.09**
			Unit: Euro

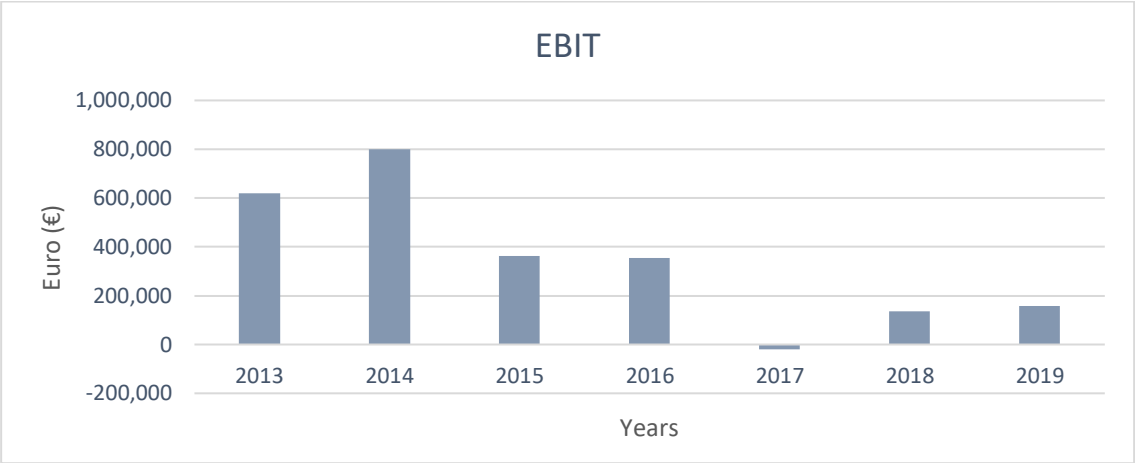
Statement of Cash Flows			
ITEMS	Periods		
	2019	2018	2017
Cash flows from operations			
Cash receipts from customers	5,989,246.53	6,394,703.38	5,962,664.73
Cash paid to suppliers	-4,174,335.05	-4,370,908.05	-4,544,459.25
Cash paid to employees	-1,624,856.59	-1,645,121.18	-1,652,788.43
Cash generated from operations	190,054.89	378,674.15	-234,582.95
Income Tax Payment / Receipt	-68,446.15	22,511.89	-79,876.76
Other receivables/payables	167,156.26	120,640.42	-1,218,190.30
Net Cash Flow from Operations	**288,765.00**	**521,826.46**	**-1,532,650.01**
Cash flows from investing activities			
Cash receipts from			
Tangible fixed assets	-252,843.09	-239,484.67	-173,294.94
Intangible assets		-22,567.16	-65,780.01
Financial Investments		-785.54	
Other assets	-366,285.63		
Cash paid for			
Tangible fixed assets	27,571.00	58,500.00	18,008.94
Financial Investments	7,500.00	7,500.00	6,397.92
Other assets	144	144	
Investment subsidies	29,229.61		
Interest and Similar income	51,160.83	21,681.40	12,157.88
Dividends	17,227.79	20,436.67	
Net Cash Flow from Investing Activities	**-486,295.49**	**-154,575.30**	**-202,510.21**
Cash flows from financing activities:			
Cash paid for			
Repayment of loans	-1,298.58	-3,117.15	-41,588.18
Interest and Similar expenses		-3,339.78	-0.57
Other financing activities		-11,149.98	
Net Cash Flow from Financing Activities	**-1,298.58**	**-17,606.91**	**-41,588.75**
Net Change in Cash and Equivalents	**-198,829.07**	**349,644.25**	**-1,776,748.97**
Effect of Exchange Rate Changes	85,975.99	168,615.18	-431,985.40
Cash at Beginning of Period	2,626,951.31	2,108,691.88	4,317,426.25
Cash at End of Period	2,514,098.23	2,626,951.31	2,108,691.88
			Unit: Euro

Balance Sheet			
ITEMS	Date		
	31/12/2019	31/12/2018	31/12/2017
ASSETS			
Fixed Assets	**2,064,896.07**	**1,779,406.53**	**1,778,218.79**
Tangible fixed assets	1,414,939.90	1,426,976.07	1,520,118.35
Investment properties	456,263.40	91,905.86	93,833.95
Intangible fixed assets	112,940.46	172,566.67	70,728.10
Other financial investments	80,752.31	86,823.93	93,538.39
Deferred taxes assets		1,134.00	
Current Assets	**7,746,973.76**	**8,122,758.27**	**7,905,903.73**
Stocks	1,172,283.35	1,463,069.45	1,462,569.24
Clients	1,678,981.26	1,795,471.98	1,995,863.45
State and other public bodies	72,300.51	149,314.51	94,290.49
Other receivables	435,919.21	282,802.16	148,386.89
Deferred	34,433.98	24,472.44	33,530.64
Financial assets held for trading	1,838,957.22	1,780,676.42	2,062,571.14
Cash and deposits	2,514,098.23	2,626,951.31	2,108,691.88
Total assets	**9,811,869.83**	**9,902,164.80**	**9,684,122.52**
EQUITY			
Subscribed capital	99,759.58	99,759.58	99,759.57
Legal reserves	57,559.46	57,559.46	57,559.46
Other reserves	667,400.75	667,400.75	667,400.75
Transited results	7,562,296.40	7,459,997.10	7,524,608.04
Revaluation surplus	9,934.01	10,698.16	11,462.32
Other equity changes	254,160.15	86,892.22	94,570.65
Net result for the period	121,689.66	101,535.15	-65,375.09
Total Equity	**8,772,800.01**	**8,483,842.42**	**8,389,985.70**
LIABILITIES			
Non-current Liabilities	**76,672.50**	**26,668.44**	**28,466.80**
Deferred tax liabilities	2,884.07	3,105.92	3,327.77
Other debt payables	73,788.43	23,562.52	25,139.03
Current Liabilities	**962,397.32**	**1,391,653.94**	**1,265,670.02**
Suppliers	159,445.57	270,578.26	464,578.79
Advances from clients	406,317.96	660,082.28	434,042.73
State and other public bodies	73,408.88	107,607.34	77,335.12
Current financing obtained	2,590.04	3,888.62	7,005.77
Other current liabilities	320,634.87	349,497.44	279,108.16
Deferred			3,599.45
Total Liabilities	**1,039,069.82**	**1,418,322.38**	**1,294,136.82**
Total Liabilities and Equity	**9,811,869.83**	**9,902,164.80**	**9,684,122.52**
			Unit: Euro

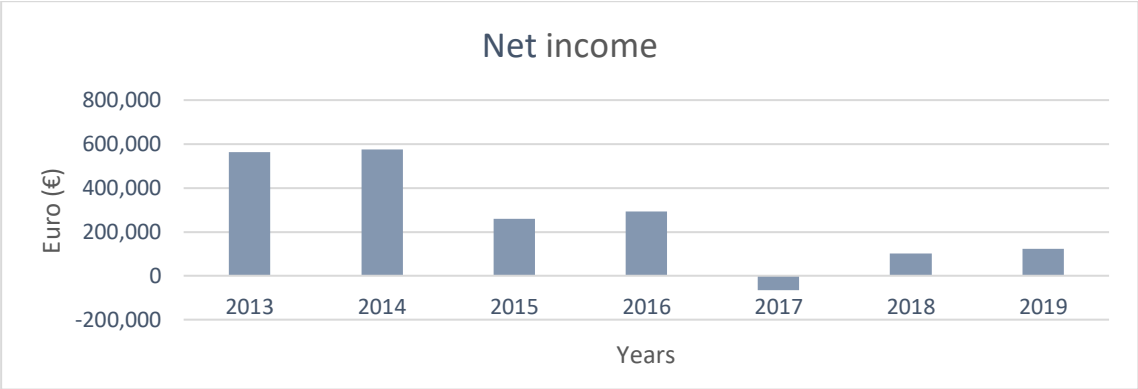
Appendix 3. DP's Sales



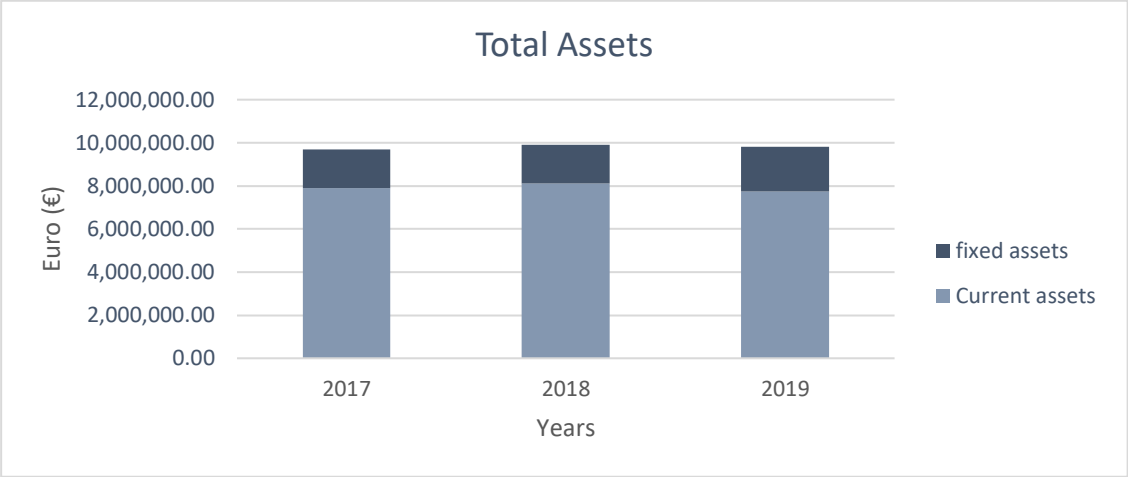
Appendix 4. DP's EBIT



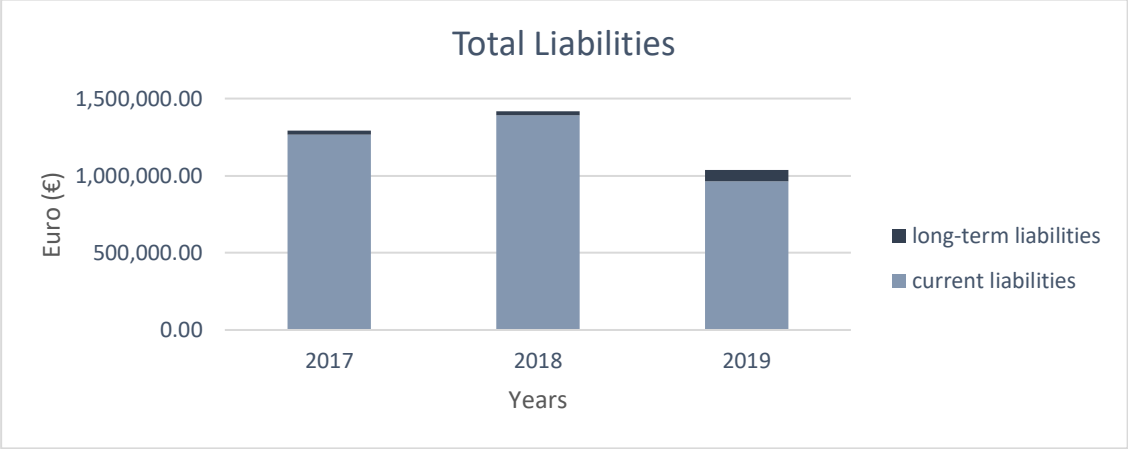
Appendix 5. DP's Net Income



Appendix 6. DP'S Total Assets



Appendix 7. DP's Total Liabilities



Appendix 8. DP's Equity

Appendix 9. DP'S Liquidity ratios

Liquidity ratios 2019	
Current ratio	**8,05**
Current assets	7 746 973,76
Current liabilities	962 397,32
Quick ratio	**6,83**
Current assets	7 746 973,76
Inventories	1 172 283,35
Current liabilities	962 397,32
Cash ratio	**2,61**
Cash	2 514 098,23
Current liabilities	962 397,32
NWC	**6 784 576,44**
Current assets	7 746 973,76
Current liabilities	962 397,32

Appendix 10. DP's Solvency ratios

Solvency ratios 2019	
D/E ratio	0,0003
Total debt	2 590,04
Equity	8 772 800,01
Debt to Assets ratio	0,0003
Total debt	2 590,04
Assets	9 811 869,83
Financial Leverage ratio	1,1184
Assets	9 811 869,83
Equity	8 772 800,01
Net Debt to EBITDA	-15,9798
Total debt	2 590,04
Cash	2 514 098,23
EBITDA	157 167,35
Debt Structure Ratio	0
Long-term debt	0
Total debt	2590,04

Appendix 11. DP's Efficiency Ratios

Efficiency ratios 2019	
Total Assets Turnover	0,61
Total assets	9 811 869,83
Sales	6 018 037,48
Fixed Assets Turnover	2,91
Fixed assets	2 064 896,07
Sales	6 018 037,48
Inventory Turnover	5,13
Sales	6 018 037,48
Inventory	1 172 283,35
Days to Sell Inventory	130,12
Inventory	1 172 283,35
COGS	3 243 296,01
Average Collection Period	100,44
Accounts Receivables	1 678 981,26
Sales	6 018 037,48
Average Payment Period	9,00
Accounts Payable	159 445,57
Purchases	6 377 822,80
Cash conversion cycle	221,56
Days to sell inventory	130,12
Average collection period	100,44
Average payment period	9,00

Appendix 12. Industry Average Ratios (Ready Ratios s.d.)

Industry: 32 - Stone, Clay, Glass, And Concrete Products

Measure of center: median (recommended)

Financial ratio	Year					
	2019	2018	2017	2016	2015	2014
Solvency Ratios						
Debt ratio	0.68	0.54	0.52	0.46	0.61	0.61
Debt-to-equity ratio	1.21	1.02	0.67	0.70	0.80	0.75
Interest coverage ratio	1.80	2.06	2.03	2.92	1.74	2.05
Liquidity Ratios						
Current Ratio	1.99	1.85	1.80	1.75	1.23	1.67
Quick Ratio	1.00	0.96	1.13	1.08	0.77	0.87
Cash Ratio	0.11	0.17	0.19	0.28	0.16	0.30
Profitability Ratios						
Profit margin	2.4%	3.8%	2.6%	3.1%	2.1%	2.9%
ROE (Return on equity), after tax	12.7%	7.3%	4%	8.8%	3%	6.4%
ROA (Return on assets)	7.5%	2.6%	1.9%	3.3%	1.8%	1.4%
Gross margin	19.3%	20.9%	24.5%	25.8%	21.3%	23.3%
Operating margin (Return on sales)	6.4%	6.9%	9.4%	9.4%	5.8%	6.4%
Activity Ratios						
Asset turnover (days)	112	433	440	416	422	375
Receivables turnover (days)	12	38	37	44	47	45
Inventory turnover (days)	17	60	60	45	54	53

Appendix 13. DP's Risk Ratios

Risk Ratios 2019	
Breakeven point	3521657,09
Total fixed costs	1 623 733,32
Gross Profit	2 774 741,47
Sales	6 018 037,48
Margin of safety	0,41
Actual sales	6 018 037,48
Breakeven sales	3 521 657,09
Degree of operational leverage	17,65
Gross profit	2 774 741,47
EBIT	157 167,35
Degree of financial leverage	1,00
EBIT	157 167,35
EBT	157 167,35
Tax burden	0,77
Net Income	121 689,66
EBT	157 167,35
Degree of combined leverage	
DOL	17,65
DFL	1,00

Appendix 14. DP's Profitability Ratios

Profitability Ratios 2019	
Return on Sales	2,61%
EBIT	157 167,35
Sales	6 018 037,48
Return on Assets	1,60%
EBIT	157 167,35
Total Assets	9 811 869,83
Return on Equity	1,39%
Net Income	121 689,66
Equity	8 772 800,01
Gross Margin	46,11%
Sales	6 018 037,48
COGS	3 243 296,01

Appendix 15. Bowman's Strategy Clock

Appendix 16. DP's Business Model

Key Partners

- Stone quarries
- Associations (national and international)
- Transportation companies

Key Activities

- Assure quality throughout value chain
- Stone Selection, Cutting blocks into slabs and tiles, Cut to size projects
- Building relationships with suppliers and clients

Key Resources

- Stone
- Competitive Machinery
- Industry experience and knowledge (C3 employees)
- Client and Supply network

Value Propositions

- High status, attractive stone for clients to build unique spaces
- High quality stone (durability, resistant to corrosion, slip resistant)
- Quality guaranteed through know-how and long experience in the industry (40 years)

Customer Relationships

- Reputation and trust are key
- Prolonged dedicated personal assistance
- Close and continued communication with clients
- Maintain long-term client relationships

Channels

- C3_1 and C3_2 facilities
- International/national events (fairs)
- Word of Mouth
- Website and Social Media (Facebook, LinkedIn, Instagram)
- Newsletter, Magazine

Customer Segments

- Individuals
- Construction companies (some fit under the category of architectures, design, consultants, installation)
- Wholesalers
- Cutting, Shaping and Finishing of Stone companies

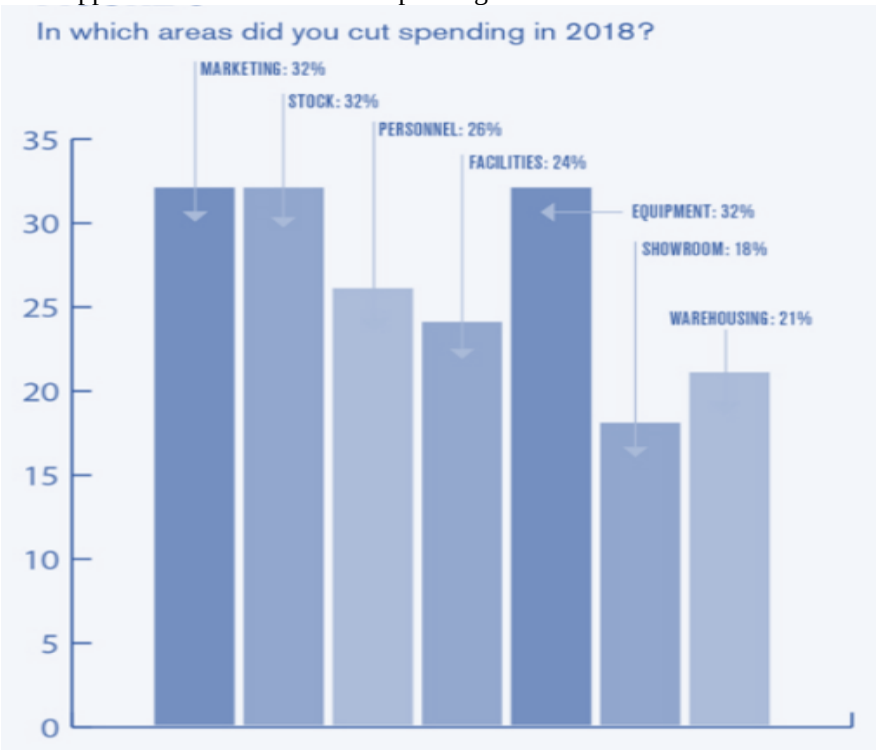
Cost Structure

- Value driven (focused on value creation, premium value proposition)
  - Fixed costs (employees salary, manufacturing facilities, machinery)
  - Variable Costs (raw materials, e.g. stone and wood)

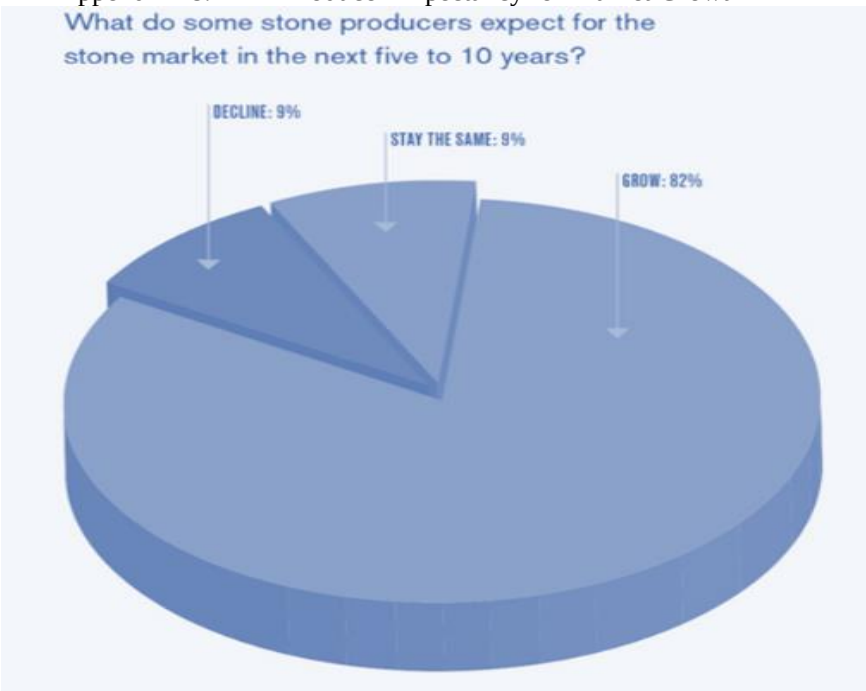
Revenue Streams

- Transaction based Revenues, namely asset sales (one time payment for stone purchased)
  - Money received per contract (in Slabs / Blocks / Cut to size project)
  - According to the type of project, contract payments are: Product feature dependant or Volume feature dependant payments

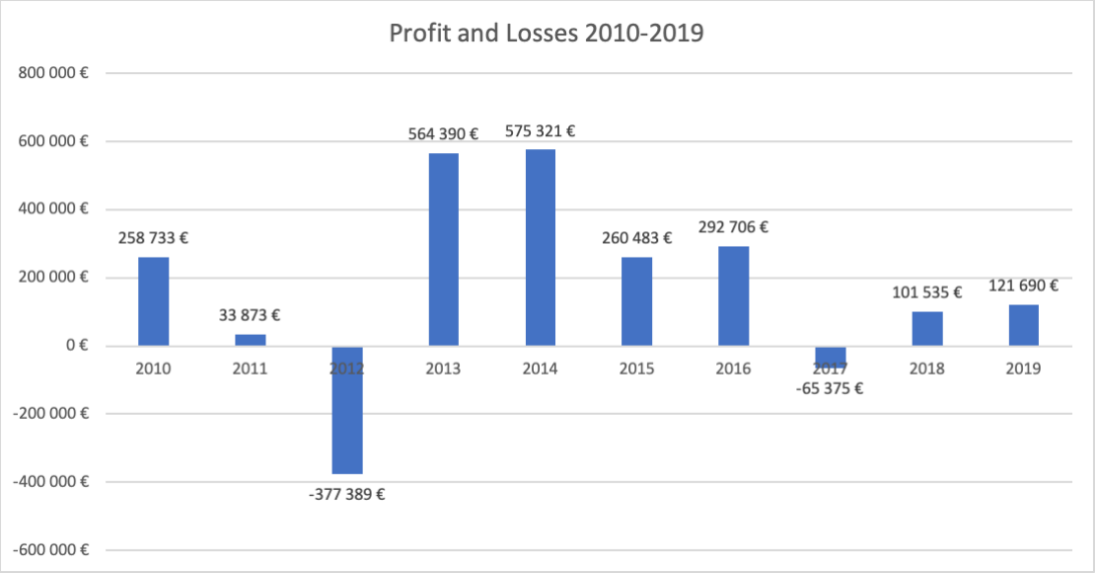
Appendix 17. Planned Spending Cuts



Appendix 18. Producer Expectancy for Market Growth



Appendix 19. DP's P&L



Appendix 20. SWOT Analysis

The origins of the SWOT analysis date back to the 1960s and 1970s in a research project at Stanford University led by Albert S. Humphrey (Wikipedia 2020), to whom it was credited. SWOT analysis assesses both internal factors (Strengths and Weaknesses) and external factors (Opportunities and Threats) of a company, providing a glance at the current and future potential of the company within its competitive set.

Strengths	Weaknesses
Know-how provided by the years of experience: The Natural Stone business profitability fluctuates a lot given the quality of raw material. As such, having experience in dealing and sourcing blocks is key. DP has access to the knowledge on Natural Stone's unique characteristics as book-matching, translucency, mechanical properties, vein-matching, cutting direction. Furthermore, their years of experience in Special Fabrication processes as well as their investment in proper machinery have translated into the mastery of Honeycomb, Stock (stone and cork), and Ceramic base techniques. **International footprint:** As further discussed above, the company has long time partners in Portugal and abroad with suppliers of raw material and clients. This has enabled them to enlarge the range of their product portfolio. **Control over some stages in the supply chain:** As one goes further down the supply chain, the profitability that can be attained with the end-product decreases. DP has successfully concentrated its business on profitable stages of the supply chain and their mastery of various product applications has made them control the supply chain from the Block to the end-product.	**Communication Strategy:** DP has been making increasing efforts to improve communication with potential clients. Recently, they have hired a new Marketing Manager, who has been activating their social media, and their website has been renewed. Nevertheless, in terms of communication strategy, the company seems to be behind other competitors. **Strategy to capture new clients and potential partners:** Currently, DP may choose the projects in which it wants to participate and sources new clients mainly through contacts and international fairs. Given that the company is not working up to its full capacity, it could invest in new strategies for attaining new clients and potential partners.
Opportunities	**Threats**
R&D initiatives: Some companies have been developing R&D teams dedicated to finding alternative uses to their raw materials. Some R&D initiatives aim at new uses of waste, others at transforming raw material, making it partly natural and partly engineered. Furthermore, R&D initiatives could be used to enhance current processes as well as an incentive for the design and creation of new products. **Acquiring and/or exploring a Quarry:** DP used to explore 3 quarries which at this time are abandoned. By backward integrating their business, they could secure the supply of some types of stone and better control prices, being also able to offer more competitive products. **Explore alternative uses for the abandoned Quarries:** Some alternative uses have been found for abandoned quarries, such as artificial lakes. DP could explore alternative uses for their quarries. **The Associations:** Currently, DP is part of a couple of associations. One of them, Assimagra, provides various services to the belonging partners. Given the current situation of the European Union, DP could explore those services and consider applying for the London Association of natural stone. **Enlarging their international footprint:** By doing so, the company could integrate new product offerings on their portfolio as well as find new clients in other countries. Currently, DP has been exploring this option. **Create new ways of acquiring customers:** They could showcase their products in a home-decoration magazine, generate engagement through their current communication channels, amongst other options. **Making a partnership with construction or architect companies:** As referenced before, their current plant is not working up to its full capacity. By partnering with other businesses at the end of the supply chain, the company could secure their financial stability, as well as high volume demands.	**Engineered Stone:** Engineered and partly engineered stone has been flooding the market. China is currently the most competitive country in the production of these alternative products. **Quarries starting their own businesses:** DP has no active quarries, and their natural stone is supplied by long-term partners (nationally and internationally). The quarries control the supply of natural stone both in quantity and price. When the owner of a quarry decides to start his/her own business, it will be able to sell slabs at a lower price or supply natural stone at a higher price. Both situations will (and have) negatively impacted DP. **Covid-19 epidemics:** As in other industries, the sales of DP have been negatively impacted by this global epidemic. **Labour laws:** The retirement age for this industry has changed in Portugal since it has been considered forced labour. As such, DP has been experiencing early retirements, especially motivated by the current pandemic.

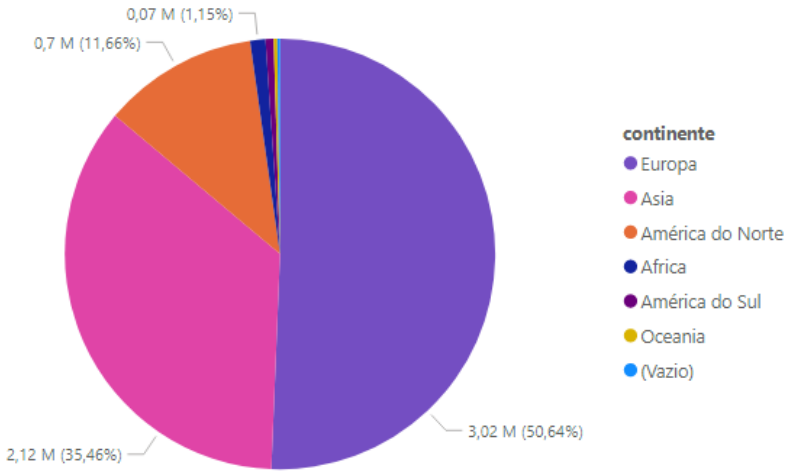
Appendix 21. TOWS Analysis

	Internal Strengths 1.Know-how provided by the years of experience 2.International footprint 3.Control over some stages in the supply chain	**Internal Weaknesses** 1.Communication Strategy 2.Strategy to capture new clients and potential partners
External Opportunities 1.R&D initiatives 2.Acquiring and/or exploring a quarry 3.Explore alternative uses for the abandoned Quarries 4.The associations 5.Enlarging their international footprint 6.Create new ways of acquiring customers 7.Making a partnership with construction or architect companies	**Use Strengths to maximize Opportunities** By using the know-how provided by several years of experience within the industry, DP could engage in R&D initiatives, exploring quarries and developing new partnerships. The know-how would give DP an edge in engaging in R&D initiatives related with the raw material. Although DP is already developing cut-to-size products that use wasted material, other players in the industry are transforming the raw material turning it into partly engineered stone or finding alternative uses for natural stone. With the help of partnerships with universities, DP could distinguish itself from other payers and compete in developing markets such as synthetic stone industry. DP's know-how and further learning economies could be a determinant factor in exploring efficiently quarries. The backward integration would allow DP to sell blocks and slabs at competing prices to other companies and have greater control over their costs. Being know-how such a valuable resource in this industry, DP could use it to establish relevant partnerships with construction companies, which would give them more security on prospect sales and on financial stability. Finally, the know-how, along with the control of various stages of the supply chain can help DP to expand its international presence through partnerships and other internationalization strategies, building new access to other markets. Finally, the large range of product portfolio, provided by a long and healthy relationship with clients and suppliers abroad, fights companies that are globally threatening the industry.	**Minimize Weaknesses by taking advantage of Opportunities** The associations to which DP belongs work as efficient channels of communication with both potential clients, suppliers, and other players within the industry. By establishing a clear strategy to attain customers, DP could make a better use of those channels as well as explore new association that would open new opportunities in different markets. By drafting a proper strategy to capture the segments that DP wants to attract, the company can profit from having more a wide range of clients whom they know how to attract and engage. By working on a communication strategy, DP can take advantage of new partnerships that bring more stable and high-volume sales, ensuring their financial stability.
External Threats 1.Engineered stone 2.Quarries starting their own business 3.Covid-19 epidemics 4.Labour laws	**Use Strengths to minimize Threats** The competitive advantage of their established and trustworthy business international relations can be used to minimize the threat of engineered stone companies and quarries that have recently started their own businesses.	**Minimize Weaknesses and avoiding Threats** DP can minimize its weaknesses and avoid current threats as engineered stone companies and quarries that started their own business. By carefully drafting a strategy for communication and capturing clients, DP can position through its points of differentiation within the market. This would enable DP to distance itself from these threats, fighting for a niche position within the industry. On the other hand, DP can also draft those new strategies in a way to face and compete alongside those players.

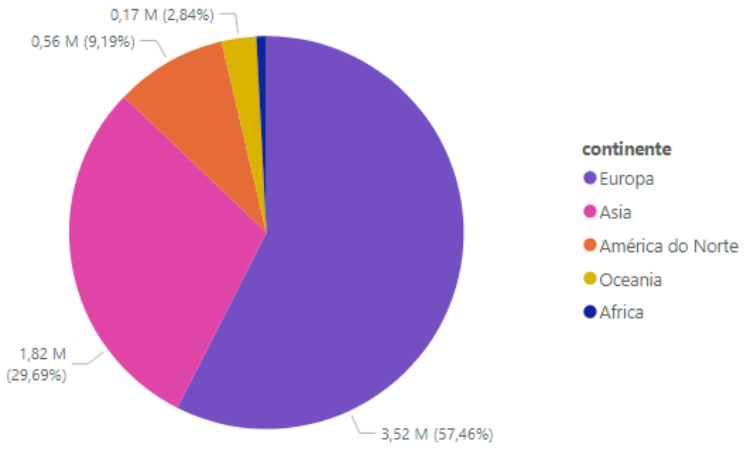
Appendix 22. Global Outlook of DP's Sales 2019

Appendix 23. DP's Sales per Continent for 2018 and 2019

Sales 2018 per continent

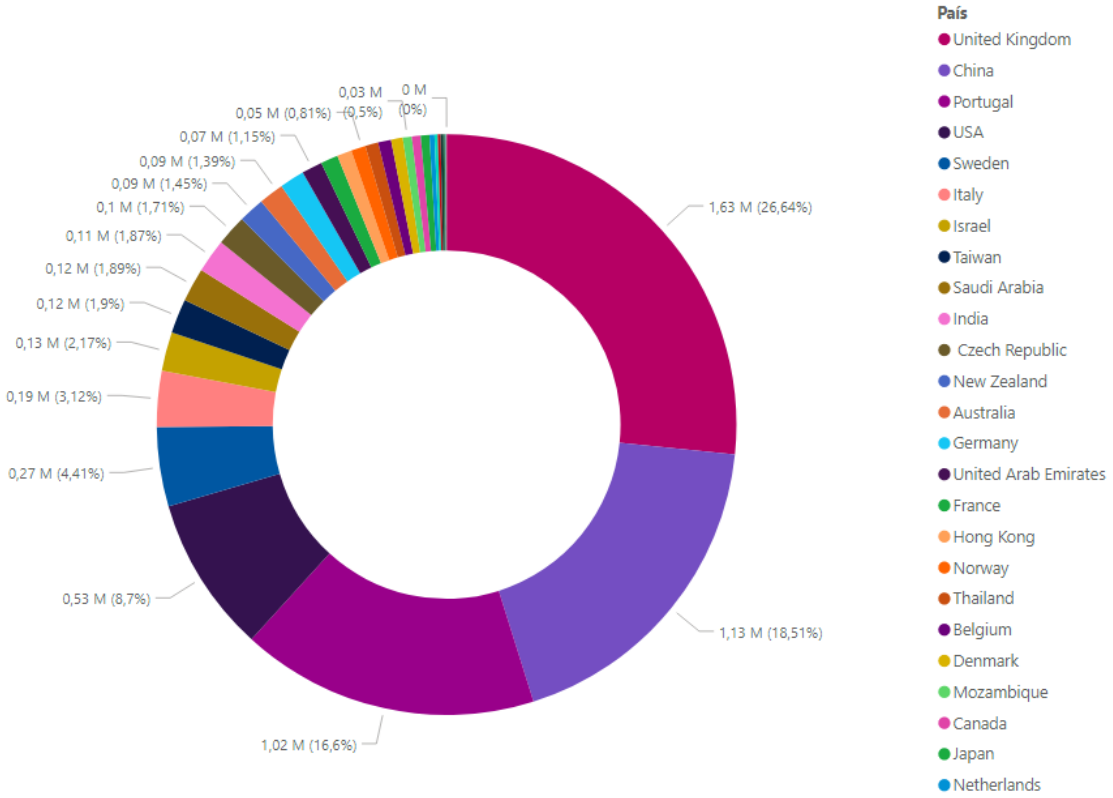


Sales 2019 per continent



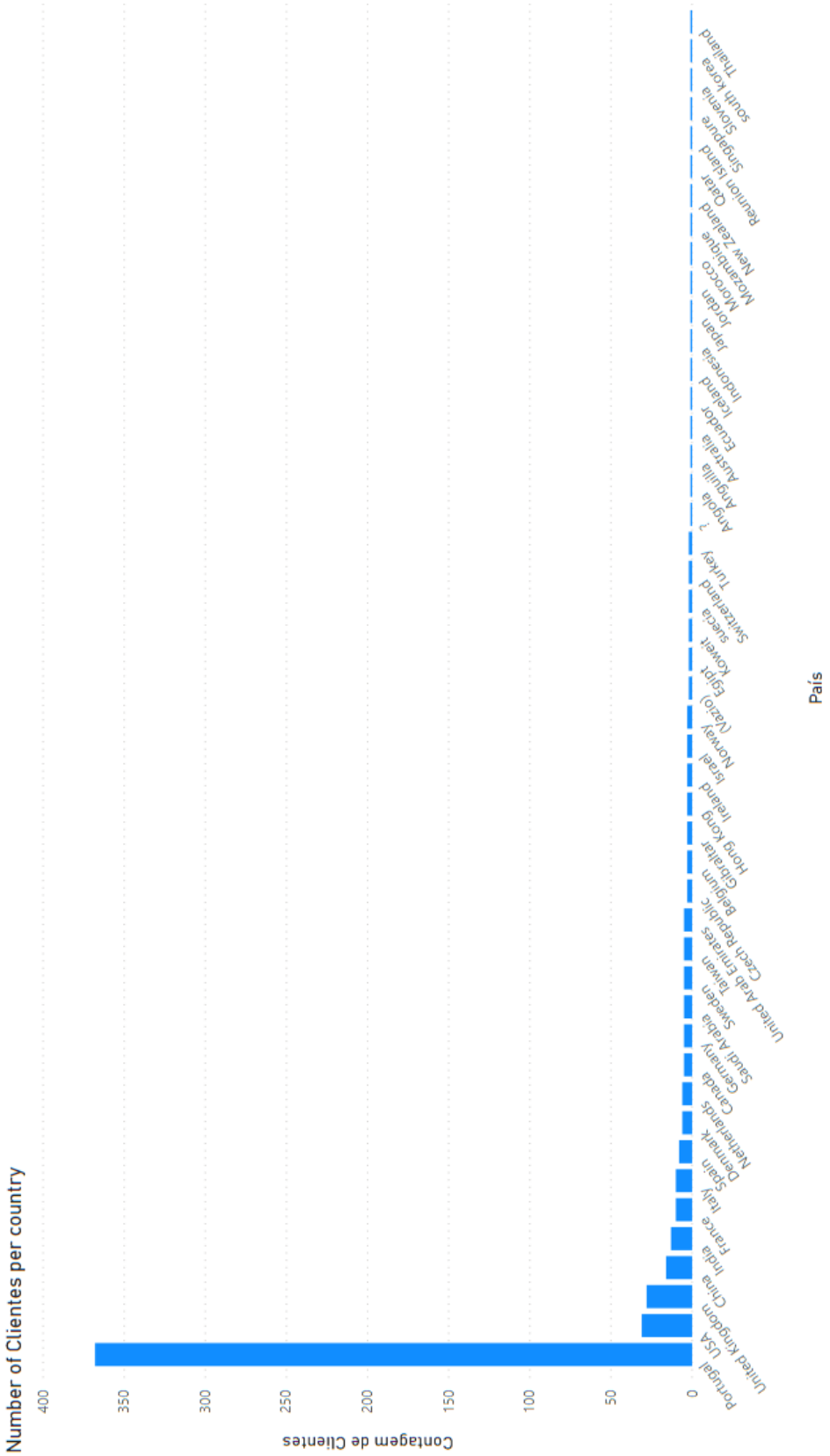
Appendix 24. DP's Percentage of Sales per Country 2019

Percentage of Sales 2019 per country

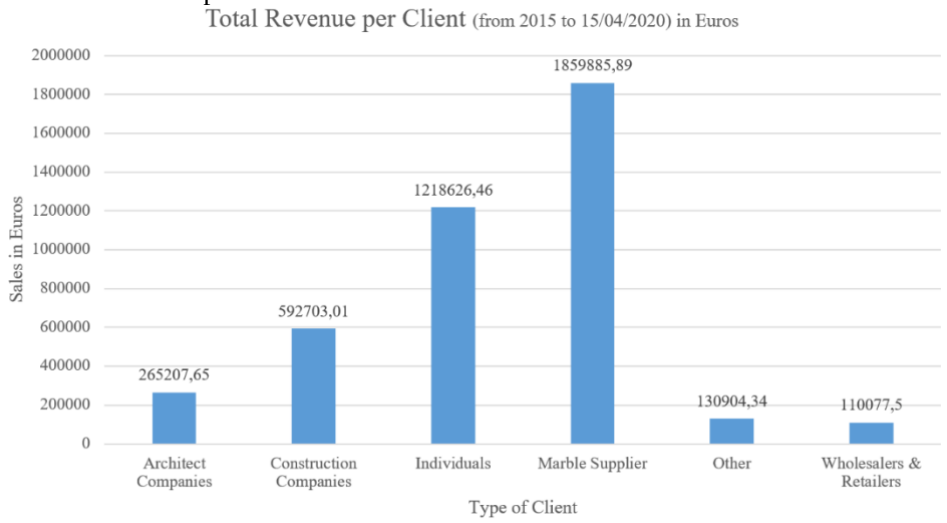


Appendix 25. DP's Sales per Country for 2018 and 2019

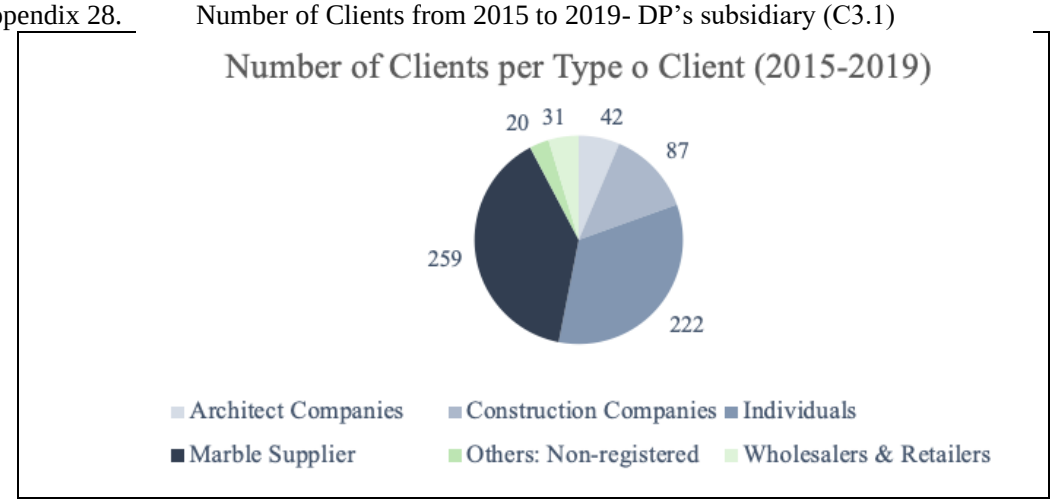
Appendix 26. Number of Clients per Country for 2019



Appendix 27. Repartition of DP's Sales 2015-2020

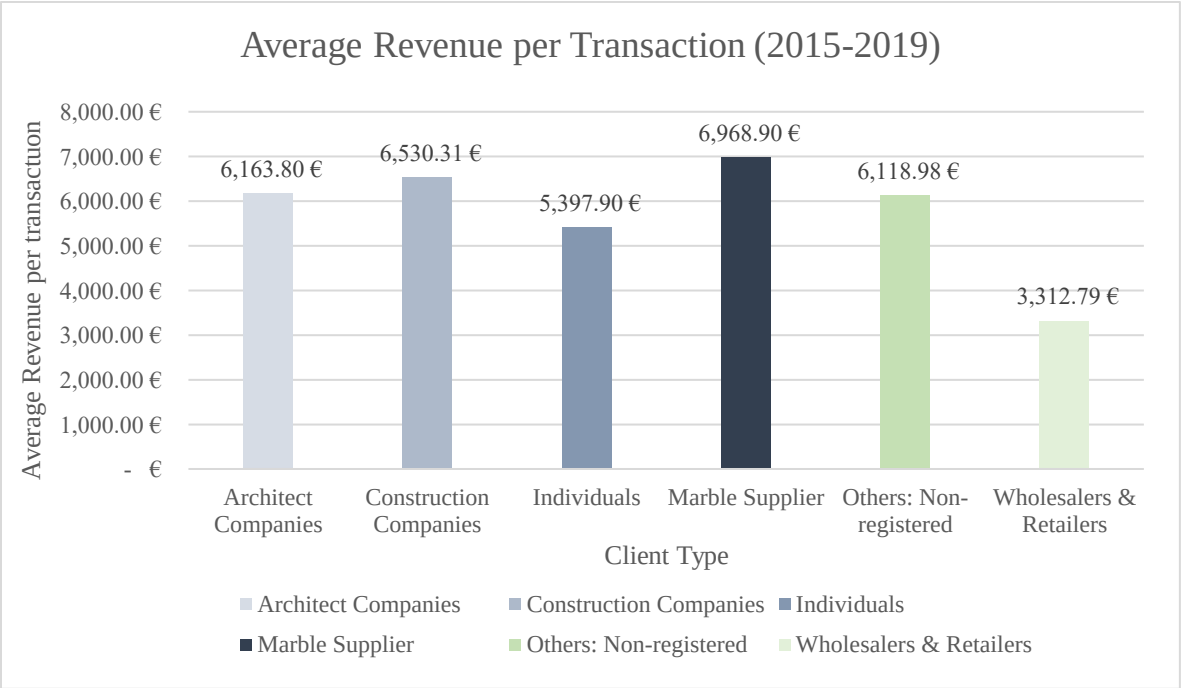


Appendix 28. Number of Clients from 2015 to 2019- DP's subsidiary (C3.1)

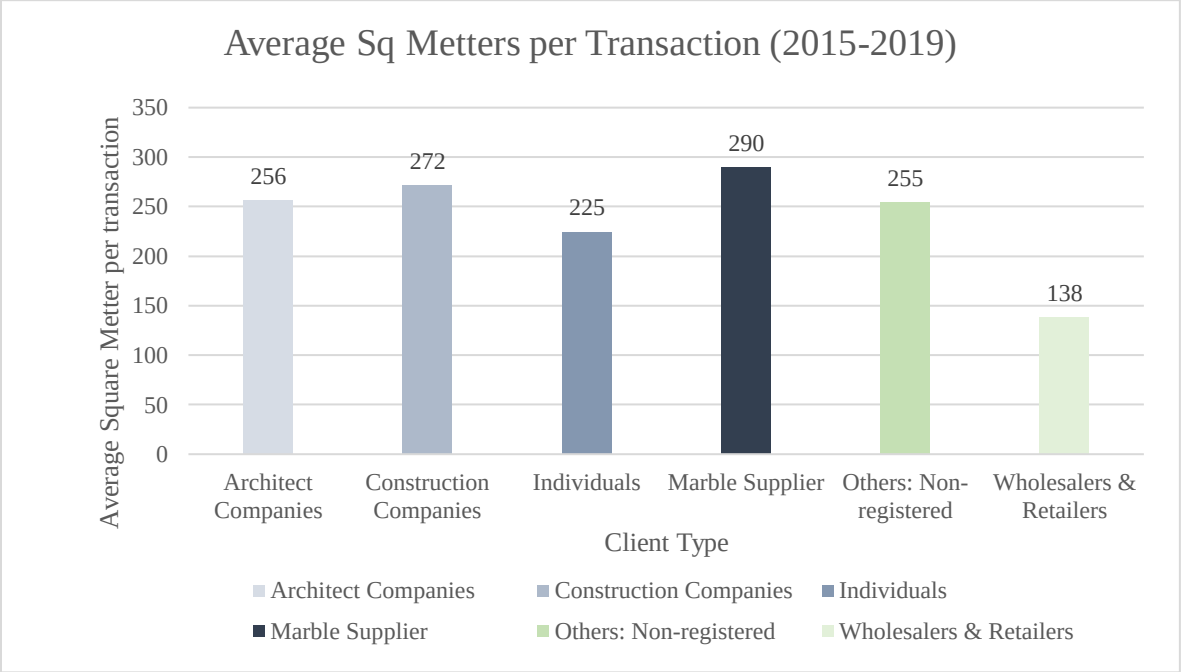


Note: These architect companies mentioned are construction companies that also do architectural projects in this area. (Architect and Design companies *per se* are not the focus of DP as they do not buy stone but simply prescribe alternatives to their clients)

Appendix 29. Average Revenue per Transaction from 2015 to 2019 - DP's subsidiary



Appendix 30. Average Square Meters per Transaction from 2015 to 2019 - DP's subsidiary (C3.1)



Note: These architect companies mentioned are construction companies that also do architectural projects. (Architect and Design companies *per se* are not the focus of DP as they do not buy stone but simply prescribe alternatives to their clients)

Appendix 31. Summary Table of Clients' Needs Assessment

Features/ Type of customer	DP's Offer	Individuals	Construction Companies	Architecture and Design Companies	Wholesalers
Role	-	One-time purchasers	High volume but on a budget purchaser	Promoters/ Prescribers	Price sensitive purchasers
Products	Blocks, Slabs, Tiles, Cut-to-size products	Tiles, Cut-to-size products	Slabs, Tiles, Cut-to-size	-	Tiles from various types of stone
Quality of Raw Martials	High quality stone, while providing on-budget solutions	Value more luxurious appearance than quality	Highly valued although these clients rely on other agents to choose type of stone	Highly valued, these clients possess deep product understanding	Valued, although they demand for stones with different quality levels
Price	Highly priced, while providing also on-budget offerings	Willingness to pay for status provided by high quality products	Price sensitive, depending on their client's available budget	High willingness to pay	Price sensitive: change stone supplier when offered a better deal. Value offers with high price diversity
Durability	High, due to high quality materials products do not need much maintenance	Highly valued	Highly valued, maintenance represents extra cost	Highly valued, maintenance represents extra cost	Valued
Flexibility in cuts, shapes, and finishes	Distinguishable cuts, shapes, and sizes which meet every possible need	Highly valued	Highly valued	Fundamental, allows to fully express their creativity	Not as valued, sell only standardized products
Trendiness	On track due to high product portfolio and decades of experience in the business	Highly valued	Highly valued, follow design guidelines of Stone consultants and Architecture and Design companies	Highly valued, these clients influence the global trendiness of types of stone	Valued, although variety of stone is preferable to trendiness

Appendix 32. Resources, capabilities and competitive advantage relation

Source: Grant, Robert (2010). Contemporary Strategy Analysis. 7th Edition.

Appendix 33. Resources of DP

Tangible		Intangible				Human
Financial	Physical	Technology	Reputation	Social	Organizational	
Cash (high solvency ratio - intangible)	Facilities, stone quarry, equipment and machinery, raw materials: stone and wood	Internal software and information database	Brand name and reputation, customer trust and loyalty	Client, supply and distribution vast and strong international networks	Culture (familiar company, close and continued relation with clients)	Employees' skills and experience, know-how

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Appendix 34. Capabilities of DP

Capabilities	Description
Product Variety	The offer a large product portfolio with many different categories of stone available
Product Storage, Packaging and Transportation	To pack, store and transport stones in na efficient and safe way.
Effecient Operational Processes	To cut, shape, resize and polish blocks, slabs and tiles
- Materials management capability - Manufacturing capability (CSF)	Involves the capailities of supply-chain management, production scheduling assembly, quality-control procedure, inventory control
Effective Stone Selection	To select the best blocks to avoid waste costas and give clietns quality stone
Quality control throughout the value chain	To guarantee and control the quality of stone from blocks extraction to final delivery

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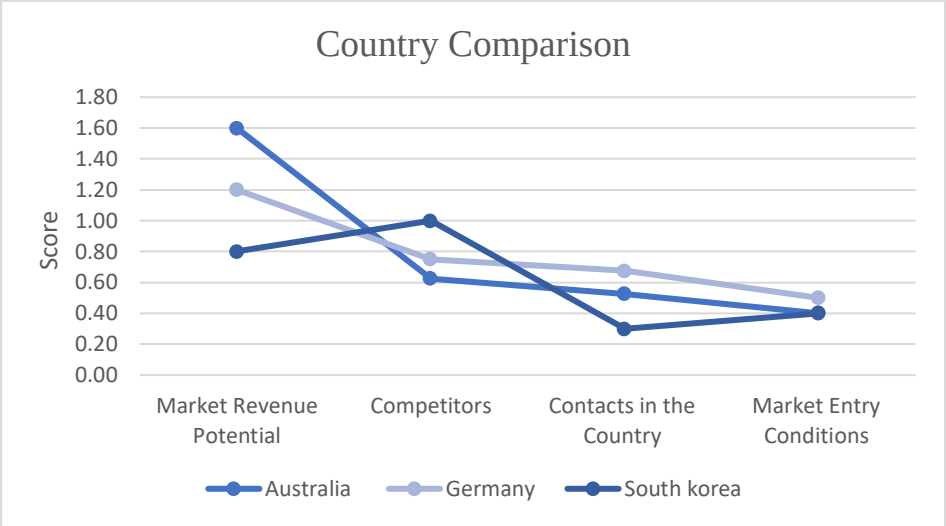
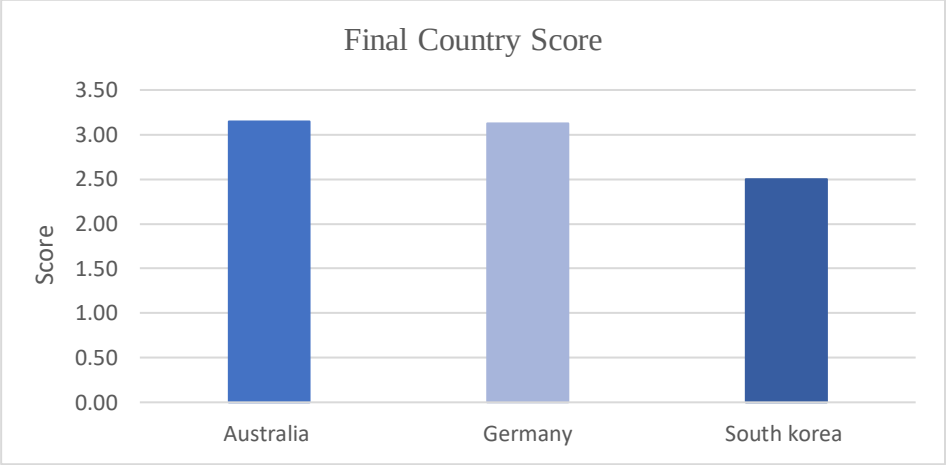
Appendix 35. DP Competitive advantages

	Relevant	Scarcity	Non-Transferability	Non-Replicability	Durability	Results
Resources						
Cash (high solvency ratio)	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
CSF facilities, Stone quarry	Yes	No	-	-	-	Parity
Equipment and machinery	Yes	No	-	-	-	Parity
Raw materials	Yes	Yes	No	No	Yes	Temporary Competitive Advantage
Internal software and database	Yes	No	-	-	-	Parity
Brand name and reputation	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Customer trust and loyalty	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Vast and Strong International Network	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Culture (close and continued relation with clients)	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Employees' know-how and experience	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Capabilities						
Product Portfolio Variety	Yes	Yes	Yes	No	Yes	Temporary Competitive Advantage
Packaging, storage and transportation	Yes	No	-	-	-	Parity
Efficient operational processes	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Effective stone selection	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage
Quality control throughout the value chain	Yes	Yes	Yes	Yes	Yes	Sustainable Competitive Advantage

Appendix 36. Country comparisons and Final scores





A Work Project, presented as part of the requirements for the Award of a Master's degree in Management from the Nova School of Business and Economics.

INCREASING INTERNATIONAL FOOTPRINT OF A NATURAL STONE BUSINESS – GEOGRAPHICAL ANALYSIS

Guillaume Labarre - 41476

Work project carried out under the supervision of:
João Pedro Delgado

04-01-2021

This work is divided into seven different parts:

Part A: Increasing International Footprint of a Natural Stone Business

Part B: Increasing International Footprint of a Natural Stone Business - Geographical Analysis *(by Guillaume Labarre)*

Part C: Increasing International Footprint of a Natural Stone Business - In-depth Market Analysis (*by Tommaso Bordignon)*

Part D: Increasing International Footprint of a Natural Stone Business - Entry Strategy (*by Inês Moraes Sarmento)*

Part E: Increasing International Footprint of a Natural Stone Business - Marketing Plan *(by Cláudia Marques)*

Part F: Increasing International Footprint of a Natural Stone Business- Financial Plan (*by Sara São João)*

Part G: Increasing International Footprint of a Natural Stone Business - Final Remarks

Keywords (Internationalization, Market Selection, Geographical Analysis, Natural Stone, Cutting Shaping and Finishing, Clustering analysis, Ranking analysis)

Abbreviations (CSF: Cutting, Shaping and Finishing Stone; DP: Company the group is doing this project for, short for DP Stones)

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sci ences DataLab, Project 22209)

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1 Geographical analysis

1.1 Chapter overview

In this chapter, the objectives were to find the best target countries for international expansion according to the chosen variables. To do so, two techniques have been used: Ranking analysis and Clustering analysis. The ranking analysis is giving a ranking of all the countries based on the chosen variables with specific weights, while the clustering analysis is gathering countries based on similarities.

For both techniques, quantitative and qualitative variables had been chosen to assess the attractiveness of a country according to DP needs.

The variables considered are taken from multiple databases such as the "Global economy database" (Economy 2020) , The "ease of doing business" report (World Bank 2020) by the world bank or the "World bank database" (The World Bank s.d.)

1.2 Variable Selection

When choosing the variables, the group decided to aggregate them into two main groups: the "Macro-Environment" variables and the "Cutting, Shaping and Finishing Stone Industry" variables. While the first covers a substantial number of variables (forty different variables, see Appendix 1 below), the second group covers data specific to DP's industry. Therefore, the importance of having results more oriented towards DP's industry made the team weigh these two groups differently. Indeed, by adding more weight to the "Cutting, Shaping and Finishing Stone Industry" variables, the team would make sure the analysis was mainly focusing on DP's industry characteristics. Therefore, the final ranking would emphasize indicators that would give DP the best environment possible for the internationalization process.

On the Macro Environment variables, for a wholistic, but mutually exclusive analysis the team started by looking at Political, Economic, Social, Technological, Environmental, and Legal (PESTEL) variables. Indeed, the “PESTEL” variables give clear insights on the overall situation in a country, making it possible to assess better the limitation or opportunities one company could find.

Finally, according to DP core business, it was necessary to include Financial, Country-Specific, and Logistics measures. Therefore, all the variables chosen gave a complete overview of each country.

1.2.1 Economic:

The current potential of a certain economy was analyzed through indexes as GDP per capita, which illustrates a country’s generated wealth and was chosen in relative terms to make country comparison easier, as well as future trends were considered through Economic Growth rate.

- **Economic growth**: It illustrates the country's future economic potential. In this case the higher the rate the better.
- **Corporate rate**: The local taxes affect company profitability (Lower rates are better).
- **Unemployment rate**: Shows countries’ workforce availability
- **Ease of Doing Business**: This yearly report by the world bank assesses how easy it is to do business in 190 (World Bank 2020) countries based on ten global indicators.

1.2.2 Financials:

Financial indicators assess the country's attractiveness and openness to foreign direct investments.

- **Exchange rate**: Exchange rates will impact profitability (money can be lost when DP exchanges foreign country currency into their domestic currency – the euro). It is necessary to avoid cases where there is a constant fluctuation in exchange rates.
- **Net investment in nonfinancial assets**: This indicator assesses how much investment is being done in each country. Investments are key drivers for a country's economic well-being, with more developed infrastructures and auxiliary/complimentary services.

1.2.3 Country Specific:

Country specifics indicators are essential for distinguishing two countries that look similar on general variables.

- **Population and Population growth**: Population size not only helps to better understand some absolute/aggregated variables, but it also represents the number of households /consumers of a certain society (current and forecasted)
- **Corruption Perceptions Index, Economic Freedom, Trade freedom Index** (0-100): These three variables give insight about global freedom in a country, with specific focus on economic freedom and trade freedom. Finally, the corruption perception index is assessing how the population perceive the action of politics (High corruption or low economic freedom can harm a business)
- **Tariff rate, applied, weighted mean, all products** (%): These are the rates DP will pay for selling its product in another country. The lower the rate the better. Indeed, with a lower rate, DP will be able to adjust its price to a local competitor without harming the profit generated by its sales.

- **Percent income earned by the top ten percent of earners**, 2018: It indicates if the income distribution in a certain country is more or less equalitarian.
- **Percentage of people with income higher than one million** €: This variable has great importance since DP focuses on high-end markets. As such, the higher the percentage the better.

1.2.4 Legal and Political:

Trading abroad is many times affected by legal and political measures. Therefore, it is relevant to analyze the impact of bureaucracy on projects. In certain countries, administrative processes take a longer time to be processed and therefore delay projects (and profit earnings) in the best-case scenario. Political Stability and Instability, Terrorism, and Violence are also factors to be considered since they present risk and can harm business.

- **Rule of law, Political rights index, Political Stability and Absence of Violence/Terrorism, Medium/long-term political risk**: These variables assess the overall stability of a country. The more stable a country is, the easier is it to do business and to plan an expansion.
- **IP protection**: To assess the extent to which a country protects companies' ideas, products, and work.

1.2.5 Environmental:

An environmental analysis is crucial and was conducted by first looking at each country's natural resource availability and usage. The analysis was finalized by looking at the Environmental Performance Index given the rising importance of environmental considerations in DP's industry

- **Total Natural Resources Rents** (%GDP), Surface Area sq. Km,

- **Electrical power Consumption** (KwH)
- **Environmental Performance Index**

1.2.6 Logistics:

Since logistics is a key component of DP business, it was necessary to check the existence and assess the quality of the logistic infrastructures in each country. As such, the variables related to global infrastructure were considered.

- **Logistics performance index**
- **Competence and quality of logistics services**
- **Quality of railroad infrastructure**; **Quality of port infrastructure**; **Quality of roads**

1.2.7 Social Indicators

Hofstede's (Insights s.d.) social dimensions models were used to conduct this analysis. For each country, the team looked for each country's respective values and subtracted to them the Portuguese corresponding values. The main idea was to obtain a value (for each Hofstede social variable) that represented how much each country culture differs from DP's (Portuguese culture)

- **Human Development Index**
- **Power Distance**
- **Individualism**
- **Masculinity**
- **Uncertainty Avoidance**

1.2.8 Technological

Technology has been evolving exponentially. New buying processes and buying platforms are created and DP must have a strong technological network in the country chosen. Furthermore, innovation and R&D play a crucial role in this industry. Therefore, the variables chosen were technological quantitative variables such as “internet user” and technological qualitative variables like “Innovation Index”.

- **Internet users** (% population) and **Mobile phone subscribers**:
- **Innovations index**
- **R&D expenditure**, percent of GDP
- **Charges for the use of intellectual property**, payments (Bop, current US$)
- **Patent applications by residents**

Regarding the second group of variables, “CSF Industry”, the team opted by clustering the measures into Demand vs Supply Drivers.

1.2.9 Demand drivers

On-Demand Drivers, one can find variables on the sector of Industrial Design, Architecture and Construction as they are examples of DP’s possible clients, and variables on Stone & Glass, Hand sharpening/polishing stones, and Natural Stone. Regarding these last two, the group considered information on imports since this analysis focuses on the Demand side. Aggregates of all the variable listed above give an overview of the demand drivers in DP’s core business:

- **Number of Awards WORLD DESIGN RANKINGS and Industrial Design** (design counts) Applications 2018 (Resident + Non-resident + Abroad) - Design variables
- **WA100**: Number of companies present in 2020 (year's top 100 architects) list by country - Architecture

- **Number of global Firms in the top 250 international** contractors by country
- **Gross Value added by Constructions** (2012) – Construction
- **Import stone & Glass** 2018
- **Imports Hand sharpening/polishing stones**,
- **Stone Total Imports** Structured Data (Cutting, Shaping and Finishing Stone Industry)

1.2.10 Supply drivers

On Supply Drivers, information's on Industrial production and Mining & Quarrying industries were gathered as they represent possible suppliers of DP in their new market. Exports on Stone & Glass, Hand sharpening/polishing stones, Natural Stone and Portuguese exports in Natural Stone were also considered to get the model more coherent

- **Industrial production**, annual percent change;
- **Gross Value Added by Mining**, Manufacturing, utilities per capita (2012) – Supply representative variables
- **Natural Stones-Portuguese Exports** in €_2020 (Assimagra)
- **Stone Total Exports** Structured Data (Cutting, Shaping and Finishing Stone industry)
- **Export Stone & Glass** 2018 ($US Thousand)
- **Exports Hand sharpening/polishing stones** (2017)

1.3 Missing values

Regarding missing values, the group divided all variables into two categories. The macro-environment and the industry specifics. In both categories, the group had quantitative and qualitative information.

There was a total of 2.05% (41 out of 1995) missing values at the beginning of our analysis. The team made sure that there was no pattern in the twenty-six variables with missing values which could false our final results and for each type of variables, different method had been used to fill the void (see appendix 4 below)

For qualitative variables such as the Social indicators, we found similar countries and did an average of their respective values. For example, for a middle east country such as the United Arab Emirates, we used « Oman / Qatar / Saudi Arabia » to get an estimate of the value. For quantitative variables like « Economic growth », we used past data to find the compound annual growth rate. Using the CAGR gives us a reliable way of finding the value that is missing. Indeed, the CAGR tells us the average evolution of the variables (Investopedia s.d.). Therefore, using this rate to find a value is the most precise in normal conditions.

1.4 Standardization of the variables:

The countries' raw data of the different variables differ in scale and dimension, it was necessary to standardize the data into z-scores, to avoid scale effects and artificial weighting. To this aim, we used the following formula:

$$X'_{ij} = \left[\frac{X_{ij} - min_i}{R_i} * (99)\right] + 1,$$

Where:

X'_{ij} is the scaled final value of country j on dimension for i;

X_{ij} is the average score of country j on dimension i;

min_i is the minium value for dimension i

R_i is the range of dimension i.

As a result, every data was converted on a 1-100 scale. For those variables where the higher the score indicates the worst results for the country, such as "Political rights index", we used the inverted formula.

After the pre-processing stage such as treating the missing values and standardizing the variables listed before, it was necessary to choose which variables to use for both analyses. The

group decided to contemplate all the fifty-four variables for the clustering analysis. The results obtained were analyzed and the group concluded that they were not perfect which led to a thorough analysis of the influence of the supply and the demand in the industry.

For that, the group performed two additional clustering analyses, one that did not include the variables related to the supply drivers of the industry and then one that did not include the variables related to the demand drivers of the industry. When comparing the three different clustering analyses, the group decided that the one that provided the best outputs was the one with both the supply and the demand included. Nonetheless, the group still found that the clusters obtained were not as perfect as we wished, which made us adopt a new approach.

In this new approach, the group decided to reduce the number of variables used for the clustering and ranking analysis. After noticing that some variables translated the same information, such as "population" and "population growth", it was decided to delete all variables that would not add any additional value to the model. With this process, a total of twenty-seven variables were deleted. With the remaining variables, the group performed a correlation analysis to make sure that none of the variables used in the models would be highly correlated, leading to biased results (see Appendix 2 below). The variables that presented a correlation $\geq|0.5| \wedge < |0.75|$ would be presented in a light blue tone, representing slightly correlated variables while the variables in grey presented a correlation $\geq|0.75|$, meaning that the variables are highly correlated and have to be deleted. In total, six variables were deleted due to a correlation above 0.75. At the end of this process, the number of remaining variables was twenty-one *(*see Appendix 6 below*)*.

1.5 Country ranking analysis

The group performed two ranking analyses, one using all fifty-four different variables and a second one using only the twenty-one variables.

Concerning the allocation of weights to the different variables, in the first ranking (see Appendix 5 below), the team decided to give greater importance to the group of variables related to the “CSF Industry” with 40% of the weight for fourteen different indicators, while the remaining 60% was divided among the forty “Macro-Environment” variables. In turn, within the “Macro-Environment” group it was given the highest weights to Country-Specific variables and Economic Indicators. This resulted in the following: “Economic Freedom Index”, “Percent income earned by the top 10% of earners”, “Trade freedom Index”, “Corruption Perceptions Index”, “Ease of Doing Business Index”, “Economic growth” and “GDP per capita” having the highest weights. Among the industry-specific variables, we divided them between supply and demand-related variables, with respective weights of 40% and 60%. As a result, “Stone Total Imports Structured Data”, “Gross Value added by Constructions” and “Stone Total Exports Structured Data” were the indicators with the highest values, respectively with 6%, 4.20%, and 4%.

In the second ranking (see Appendix 6 below), where the team used only twenty-one variables, fourteen within the “Macro-Environment” group and seven related to the industry, both groups with the same weight of 50%. As a result, “Percent income earned by the top 10% of earners”, “Trade freedom Index”, Economic growth, and GDP per capita were the indicators with the highest values in the Macro-Environment" group. On the other hand, in the industry group, “Stone Total Imports Structured Data”, “Gross Value added by Constructions” and “Stone Total Exports Structured Data” and “Industrial Design Applications (Resident + Non-resident + Abroad)” were given the highest weights, respectively 15%, 7.5%, 7% and 7.5% (see Appendix 3 below).

Finally, we used the “SUMPRODUCT” matrix in Excel to achieve the two final country rankings.

1.6 Clustering analysis

To find the optimal number of clusters, the team used the Two-Step Cluster analysis. This exploratory model reveals natural groupings by comparing the values of a model-choice criterion across different clustering solutions. After setting the optimal number of clusters as two, the group proceeded into choosing the clustering method. Amongst the available alternatives, the group tested the hierarchical clustering technique with Centroid clustering # and Ward’s method # and used the respective dendrograms to choose which model to use. Finally, Ward’s Clustering Algorithm was chosen since clusters were clearer and distinguishable.

Given the nature of the standardized variables (Interval) amongst the available alternatives (Euclidean distance, squared Euclidean distance, cosine, Pearson correlation, Chebychev, block, Minkowski, and customized), the group chose to use the sum of squared differences between the values (Squared Euclidean distance). Finally, the group chose a range from 0 to 1 that can be used in standardized variables and subtracts the minimum value from each item, and divides it by the range.

Having followed the above methodology, the team was able to group the fifty-nine countries in two main clusters and fourteen subclusters, given their similarities (see Appendix 7 below). After analyzing the average score value of each subcluster on all variables, as well as the variables with the smallest range within each cluster. The subclusters ten, eleven, and twelve were found to be the strongest ones.

These three subclusters all belong to cluster number two. Subcluster ten is composed of Israel and South Korea, taking the places 26th and 8th in the Country Ranking analysis. This subcluster is characterized by above-average values in Environmental Performance Index (70.52/100), Ease of doing business (89.32/100), Internet users % of the population (91.22/100), and R&D (98.59/100), but scores low in Stone total exports (1.05/100), Natural stones Portuguese exports (2.07/100), and Total natural resources rent (1.23/100).

Subcluster eleven is composed of fifteen countries from Europe, Middle East, Asia, Oceania, and North America which ranked below thirty in the country ranking analysis, where Switzerland, Australia, and Sweden rank the highest (4th, 10th, and 11th place respectively). The subcluster is characterized by a high score in Internet users (93.03/100), Ease of doing business (88.98/100), Political stability and absence of violence (84.31/100), and Logistics Performance Index (83/100), although they scored low in Stone total exports (1.46/100).

Finally, subcluster twelve is the best subcluster country-ranking-wise, being composed of six European countries and Japan. The best-ranked country is Germany, followed by France and then Japan (3rd, 5th, and 6th place respectively). The subcluster scores were significantly low at Total natural resources rent (1.37/100), which makes sense since Europe does not have many natural resource areas (mining, quarrying). Countries score similarly high in Ease of doing business (82.8/100), Internet users % of the population (87.13/100), Environmental Performance Index (88.85/100), and Logistics Performance Index (85.73/100).

1.7 Potential candidates' selection

Next, the group had to select potential countries for a more in-depth analysis, and for this step, it used both country ranking information and clustering information. A minimum of three countries was set by the group as studying less than three countries could lead to missing good potential destinations.

The ranking analysis performed gave a glance at how attractive a market is. As such, first, the team looked at the country ranking and checked what were the 30th highest countries. Here, it was noticed that some of these top-ranked countries were not worth going to as DP already had a significant footprint in those markets such as the UK, China, USA. Hence, these specific countries were automatically excluded from its potential expansion list.

Secondly, the team looked at the cluster analysis. Indeed, characterizing each cluster (see Appendix 8 below) and each subcluster was mandatory to be able to conclude on their attractivity. Attractivity of the clusters has been decided according to the characteristic that needs to be present for the market to be a good place for DP. For example, subclusters four, eight, and nine were not attractive to enter, and sub-cluster five and fourteen were already excluded as they only contained China and the US

Next, by using crossing information from both clustering and ranking analysis, the team realized that not only cluster two presented better subclusters but also that most of the top thirty ranked countries belonged to this cluster. As such, it chose to work with this one. Within this cluster, the team followed the next rationale:

(As before mentioned, subcluster fourteen was not being considered since DP already has a significant footprint there). Hence, only the remaining subclusters will be considered.

- Subcluster eleven and twelve were the strong ones since they presented very high-ranked countries, as well as countries in which DP was already present and had a significant percentage of its sales there. As such, choosing countries in these clusters is ideal, not only because the cluster presents market characteristics similar to those where DP is already present, but also because all countries in this cluster are well ranked.
- On subcluster eleven, the first better-ranked country was Australia, positioned as 10th. Located in the continent of Oceania, according to Assimagra's report there are low Natural Stone Portuguese exports there, meaning it is expected to be low Portuguese competition in

this country. Furthermore, DP has already some experience in this country through multiple spontaneous projects done in the past, and DP's sales representative claims for it to be a good market, yet they were missing a strategy to take advantage of its full potential.

- On subcluster twelve, Germany was chosen since it was the better-ranked country (3rd position) and geographically really close to Portugal (Europe).
- Lastly, the group also chose South Korea, which added more diversity to the analysis by being in a different subcluster, subcluster number ten. South Korea ranked 8th and ranked low on natural stone Portuguese exports which give insight about the Portuguese competition in the country. Lastly, since the last two chosen countries were from Europe. The group decided to diversify by choosing a country located in Asia.

1.8 Limitations

Finding specific information on the industry was difficult. Indeed, this industry being inaccessible, it was very challenging to find up-to-date data on specific points. Therefore, the team had to adjust and take some pieces of information from broader perspectives. For example, we added the variable "Stone and Glass Import and Export" because it was the only variable with sufficient information's in the year 2018. To overpass the lack of specific information, the group used proxy variables that would still represent the industry in a general manner.

As explained before, finding detailed information's on the natural stone industry was complicated. Therefore, it also has impacted the years of the variable the team was able to extract. For example, for the variable "gross value added by construction", 2012 was the most recent year available.

Therefore, in our ranking and clustering analysis, the variables are extracted mainly from 2018 and 2019 with an exception for the "gross value added by construction" which is from 2012.

Our analysis considered ninety-five countries. Finding information for the ninety-five countries on the twenty-one variables chosen was not expected. Therefore, we used two methods to fill the gap in some variables. Either the average of the value of similar countries for qualitative variables or the Compound annual growth rate of the past values for quantitative variables.

Using formulas such as “the average of similar countries” or “CAGR” doesn’t give the exact value of the variables. Indeed, it gives a good estimation of the value if the trends followed by the variables is the same over multiple years. Nevertheless, with the past years being full of unexpected events these variables will have to be taken with a global approach.

Regarding the SPSS hierarchical (37 s.d.) analysis there is a limitation on the number of clusters which is chosen partially. Moreover, there can be an issue if the data sets contain too many errors. That’s why the group put the limit of missing value at five percent.

2 Conclusion:

DP is ready for the internationalization process and will have to follow the path stated in the expansion phases in the report. All the variables were chosen in the ranking and clustering analysis gives a clear idea of the attractiveness of multiple locations. Nevertheless, as stated before, we need to take the results of our analysis on a global approach and add more qualitative aspects when focusing on our targeted countries in the in-depth analysis.

The three countries that will be analyzed more in-depth will be Australia / Germany and South-Korea.

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4 Appendixes:

Appendix 1. List of the Variables Initially considered

CATEGORIES	SUBCATEGORIES	VARIABLES	number of variables
MACRO ENVIRONMENT	Economic Indicators	Ease of Doing Business (2020) Economic growth: the rate of change of real GDP GDP per capita, current U.S. dollars (2019) Inflation: percent change in the Consumer Price Index (2019) Unemployment rate (2019) Corporate tax rate (2019)	6
	Financial	Exchange rate: local currency units per U.S. dollar Net investment in nonfinancial assets (% of GDP) (2016)	2
	Country Specific Indicators	Corruption Perceptions Index, 100 = no corruption (2019) Population (2019) Population growth (annual %) (2019) Economic freedom, overall index (0-100) (2019) Tariff Rate, applied, weighted mean, all products (%) (2019) Percent income earned by the top 10 percent of earners, (2018)- Country rankings Percentage of people with income > 1million Trade freedom index (0-100) (2019)	8
	Legal and Political Indicators	Rule of law index (-2.5 weak; 2.5 strong) (2018) Political rights index, 7 (weak) - 1 (strong) (2019) Political Stability and Absence of Violence/Terrorism: Estimate 2019 (-2.5 weak; 2.5 strong) Intellectual Property Protection (2011) (Score scaled from 1(very weak) to 7 (very strong)) Medium/long-term political risk (1=low, 7=high) (2019)	5
	Environmental	Total Natural Resources Rents (%GDP) (2019) Environmental Performance Index (2019) Surface Area sq. Km (2019) Electrical power Consumption (KwH) (2019)	4
	Logistics	Logistics performance index: Competence and quality of logistics services (1=low to 5=high)_2018 Quality of railroad infrastructure, 1(low) - 7(high) (2019) Quality of port infrastructure, 1(low) - 7(high) (2019) Quality of roads, 1(low) - 7(high) (2019)	4
	Social Indicators	Human Development Index (most updated) Power Distance (most updated) Individualism (most updated) Masculinity (most updated) Uncertainty Avoidance (most updated)	5
	Technological	Internet users, percent of population (2019) Innovations index (2019) Mobile phone subscribers (2019) Research and development expenditure, percent of GDP (2019) Charges for the use of intellectual property, payments (BoP, current US$)_(2019) Patent applications by residents (2019)	6
CUTTING, SHAPING AND FINISHING STONE INDUSTRY	Demand Drivers	Number of Awards WORLD DESIGN RANKINGS (2020) WA100: Number of companies present in 2020 (year's top 100 architects) list by country Number of global Firms in the top 250 international contractors by country (2018) Industrial Design (design counts) Applications 2018 (Resident + Non resident + Abroad) Import stone & Glass 2018 ($US Thousand) Imports_Hand sharpening/polishing stones (2017) Stone_Total Imports_Structured Data (Cutting, Shaping and Finishing Stone Industry) (2017) Gross Value added by Constructions (2012)	8
	Supply Drivers	Natural Stones-Portuguese Exports in €_2020 (Assimagra) Industrial production, annual percent change Stone_Total Exports_Structured Data (Cutting, Shaping and Finishing Stone industry) (2017) Exports_Hand sharpening/polishing stones (2017) Export Stone & Glass 2018 ($US Thousand) (2019) Gross Value Added by Mining, Manufacturing, utilities per capita (2012)	6
Total number of variables			54

Appendix 2. Correlation's Matrix

	Corruption Perceptions Index, 100 = no corruption (2019)	Rule of law index (-2.5 weak; 2.5 strong) (2018)	Political Stability and Absence of Violence/Terrorism: Estimate 2019 (-2.5 weak; 2.5 strong)	Human Development Index (0 - 1) (2018)	Ease of Doing Business (2020)	Economic growth: the rate of change of real GDP (2019)	GDP per capita, current U.S. dollars (2019)	Exchange rate: local currency units per U.S. dollar (2019)	Trade freedom index (0-100) (2019)	Industrial production, annual percent change (2019)	Net investment in nonfinancial assets (% of GDP) (2016)	Total Natural Resources Rents (%GDP) (2018)	Internet users, percent of population (2019)	Innovations index (0-100) (2019)	Research and development expenditure, percent of GDP	Environmental Performance Index (2020)	Logistics performance index: Competence and quality of logistics services (1=low to 5=high)_2018	Charges for the use of intellectual property, payments (BoP, current US$)_(2019)	Stone_Total Exports_Structured Data	Stone_Total Imports_Structured Data	Exports_Hand sharpening/polishing stones (2017)	Imports_Hand sharpening/polishing stones (2017)	Gross Value added by Constructions (2012)	Natural Stones-Portuguese Exports in €_2020	Gross Value Added by Mining, Manufacturing, utilities per capita (2012)	% of people with income > 1million	Industrial Design (design counts) Applications 2018 (Resident + Non resident + Abroad)
Corruption Perceptions Index, 100 = no corruption (2019)	**1,00**	0,96	0,75	0,80	0,65	-0,28	0,84	0,15	0,65	-0,20	-0,21	-0,25	0,69	0,84	0,67	0,77	0,80	0,34	-0,08	0,20	0,06	0,20	0,11	0,22	0,39	0,76	0,20
Rule of law index (-2.5 weak; 2.5 strong) (2018)	0,96	**1,00**	0,76	0,82	0,68	-0,19	0,84	0,12	0,67	-0,20	-0,20	-0,27	0,71	0,88	0,71	0,79	0,82	0,34	-0,09	0,23	0,07	0,25	0,12	0,21	0,38	0,76	0,20
Political Stability and Absence of Violence/Terrorism: Estimate 2019	0,75	0,76	**1,00**	0,71	0,46	-0,16	0,67	0,06	0,65	-0,37	-0,10	-0,13	0,66	0,62	0,42	0,68	0,58	0,22	-0,10	0,08	0,00	0,05	0,02	0,07	0,36	0,52	0,09
Human Development Index (0 - 1) (2018)	0,80	0,82	0,71	**1,00**	0,72	-0,29	0,76	0,17	0,76	-0,29	-0,25	-0,18	0,90	0,83	0,63	0,85	0,76	0,32	-0,03	0,23	0,08	0,20	0,14	0,21	0,38	0,63	0,21
Ease of Doing Business (2020)	0,65	0,68	0,46	0,72	**1,00**	-0,01	0,52	0,09	0,69	-0,09	-0,26	-0,22	0,70	0,75	0,55	0,59	0,64	0,29	0,06	0,25	0,19	0,31	0,22	0,24	0,21	0,49	0,25
Economic growth: the rate of change of real GDP (2019)	-0,28	-0,19	-0,16	-0,29	-0,01	**1,00**	-0,26	-0,25	-0,12	0,21	0,00	-0,12	-0,29	-0,12	-0,12	-0,24	-0,22	0,07	0,13	-0,08	0,08	0,04	0,05	-0,02	-0,31	-0,29	0,01
GDP per capita, current U.S. dollars (2019)	0,84	0,84	0,67	0,76	0,52	-0,26	**1,00**	0,16	0,55	-0,23	-0,14	-0,14	0,65	0,80	0,63	0,73	0,77	0,45	-0,06	0,28	0,08	0,22	0,14	0,21	0,55	0,81	0,20
Exchange rate: local currency units per U.S. dollar (2019)	0,15	0,12	0,06	0,17	0,09	-0,25	0,16	**1,00**	0,05	-0,07	-0,10	-0,03	0,09	0,10	0,12	0,21	0,00	0,06	0,03	0,01	0,04	-0,28	0,02	0,06	0,10	0,12	0,06
Trade freedom index (0-100) (2019)	0,65	0,67	0,65	0,76	0,69	-0,12	0,55	0,05	**1,00**	-0,24	-0,25	-0,26	0,72	0,63	0,35	0,61	0,57	0,17	-0,11	0,13	-0,02	0,15	-0,01	0,06	0,23	0,49	0,07
Industrial production, annual percent change (2019)	-0,20	-0,20	-0,37	-0,29	-0,09	0,21	-0,23	-0,07	-0,24	**1,00**	-0,07	-0,08	-0,24	-0,21	-0,05	-0,27	-0,21	-0,11	0,09	-0,02	0,04	-0,06	0,01	-0,04	-0,07	-0,15	-0,04
Net investment in nonfinancial assets (% of GDP) (2016)	-0,21	-0,20	-0,10	-0,25	-0,26	0,00	-0,14	-0,10	-0,25	-0,07	**1,00**	0,64	-0,06	-0,35	-0,29	-0,33	-0,35	-0,18	-0,14	-0,08	-0,17	-0,16	-0,20	-0,13	0,35	-0,23	-0,20
Total Natural Resources Rents (%GDP) (2018)	-0,25	-0,27	-0,13	-0,18	-0,22	-0,12	-0,14	-0,03	-0,26	-0,08	0,64	**1,00**	-0,03	-0,33	-0,32	-0,36	-0,32	-0,14	-0,08	-0,05	-0,11	-0,16	-0,10	-0,07	0,40	-0,19	-0,16
Internet users, percent of population (2019)	0,69	0,71	0,66	0,90	0,70	-0,29	0,65	0,09	0,72	-0,24	-0,06	-0,03	**1,00**	0,68	0,49	0,73	0,61	0,20	-0,10	0,19	0,01	0,13	0,05	0,15	0,46	0,50	0,10
Innovations index (0-100) (2019)	0,84	0,88	0,62	0,83	0,75	-0,12	0,80	0,10	0,63	-0,21	-0,35	-0,33	0,68	**1,00**	0,81	0,80	0,85	0,48	0,13	0,33	0,29	0,43	0,34	0,38	0,25	0,77	0,43
Research and development expenditure, percent of GDP	0,67	0,71	0,42	0,63	0,55	-0,12	0,63	0,12	0,35	-0,05	-0,29	-0,32	0,49	0,81	**1,00**	0,68	0,74	0,32	0,11	0,37	0,27	0,38	0,33	0,30	0,21	0,62	0,41
Environmental Performance Index (2020)	0,77	0,79	0,68	0,85	0,59	-0,24	0,73	0,21	0,61	-0,27	-0,33	-0,36	0,73	0,80	0,68	**1,00**	0,72	0,30	-0,10	0,20	0,00	0,11	0,09	0,24	0,22	0,62	0,21
Logistics performance index	0,80	0,82	0,58	0,76	0,64	-0,22	0,77	0,00	0,57	-0,21	-0,35	-0,32	0,61	0,85	0,74	0,72	**1,00**	0,42	0,13	0,29	0,26	0,46	0,32	0,38	0,36	0,73	0,40
Charges for the use of ip, payments (2019)	0,34	0,34	0,22	0,32	0,29	0,07	0,45	0,06	0,17	-0,11	-0,18	-0,14	0,20	0,48	0,32	0,30	0,42	**1,00**	0,24	0,38	0,41	0,45	0,46	0,37	0,13	0,28	0,43
Stone_Total Exports_Structured Data	-0,08	-0,09	-0,10	-0,03	0,06	0,13	-0,06	0,03	-0,11	0,09	-0,14	-0,08	-0,10	0,13	0,11	-0,10	0,13	0,24	**1,00**	0,00	0,82	0,29	0,74	0,55	-0,05	-0,04	0,74
Stone_Total Imports_Structured Data	0,20	0,23	0,08	0,23	0,25	-0,08	0,28	0,01	0,13	-0,02	-0,08	-0,05	0,19	0,33	0,37	0,20	0,29	0,38	0,00	**1,00**	0,36	0,75	0,55	0,20	0,13	0,37	0,37
Exports_Hand sharpening/polishing stones (2017)	0,06	0,07	0,00	0,08	0,19	0,08	0,08	0,04	-0,02	0,04	-0,17	-0,11	0,01	0,29	0,27	0,00	0,26	0,41	0,82	0,36	**1,00**	0,63	0,93	0,61	0,00	0,14	0,85
Imports_Hand sharpening/polishing stones (2017)	0,20	0,25	0,05	0,20	0,31	0,04	0,22	-0,28	0,15	-0,06	-0,16	-0,16	0,13	0,43	0,38	0,11	0,46	0,45	0,29	0,75	0,63	**1,00**	0,73	0,39	0,03	0,37	0,61
Gross Value added by Constructions (2012)	0,11	0,12	0,02	0,14	0,22	0,05	0,14	0,02	-0,01	0,01	-0,20	-0,10	0,05	0,34	0,33	0,09	0,32	0,46	0,74	0,55	0,93	0,73	**1,00**	0,65	0,03	0,22	0,83
Natural Stones-Portuguese Exports in €_2020	0,22	0,21	0,07	0,21	0,24	-0,02	0,21	0,06	0,06	-0,04	-0,13	-0,07	0,15	0,38	0,30	0,24	0,38	0,37	0,55	0,20	0,61	0,39	0,65	**1,00**	0,08	0,25	0,74
GVA by Mining, Manufacturing, utilities per capita (2012)	0,39	0,38	0,36	0,38	0,21	-0,31	0,55	0,10	0,23	-0,07	0,35	0,40	0,46	0,25	0,21	0,22	0,36	0,13	-0,05	0,13	0,00	0,03	0,03	0,08	**1,00**	0,32	0,04
% of people with income > 1million	0,76	0,76	0,52	0,63	0,49	-0,29	0,81	0,12	0,49	-0,15	-0,23	-0,19	0,50	0,77	0,62	0,62	0,73	0,28	-0,04	0,37	0,14	0,37	0,22	0,25	0,32	**1,00**	0,27
Industrial Design (design counts) Applications 2018	0,20	0,20	0,09	0,21	0,25	0,01	0,20	0,06	0,07	-0,04	-0,20	-0,16	0,10	0,43	0,41	0,21	0,40	0,43	0,74	0,37	0,85	0,61	0,83	0,74	0,04	0,27	**1,00**

Appendix 3. List of the variables used for analysis (Cluster and Ranking) and their weights

WEIGHT	CATEGORIES	WEIGHT	SUBCATEGORIES	WEIGHT	VARIABLES	#
50%	MACRO ENVIRONMENT	11,50%	Economic Indicators	3,22%	Ease of Doing Business (2020)	3
				4,03%	Economic growth: the rate of change of real GDP (2019, 2018 when data is missing)	
				4,26%	GDP per capita, current U.S. dollars (2019, 2018 when data is missing)	
		6,00%	Financial	3,00%	Exchange rate: local currency units per U.S. dollar	2
				3,00%	Net investment in nonfinancial assets (% of GDP) (2016, 2015-2013 if values are missing)	
		10,00%	Country Specific	6,00%	Percentage of people with income > 1million	2
				4,00%	Trade freedom index (0-100) (2019, 2018 when data is missing)	
		3,00%	Political	3,00%	Political Stability and Absence of Violence/Terrorism: Estimate 2019 (-2.5 weak; 2.5 strong)	1
		6,00%	Environmental	3,00%	Total Natural Resources Rents (%GDP)	2
				3,00%	Environmental Performance Index	
		3,50%	Logistics	3,50%	Logistics performance index: Competence and quality of logistics services (1=low to 5=high)_2018	1
		10,00%	Technological	3,30%	Internet users, percent of population	3
				3,30%	Research and development expenditure, percent of GDP	
				3,40%	Charges for the use of intellectual property, payments (BoP, current US$)_(2019, 2015-18 if values is missing)	
50%	INDUSTRY	30,00%	Demand Drivers	7,50%	Industrial Design (design counts) Applications 2018 (Resident + Non resident + Abroad)	3
				15,00%	Stone_Total Imports_Structured Data (Cutting, Shaping and Finishing Stone Industry)	
				7,50%	Gross Value added by Constructions (2012)	
		20,00%	Supply Drivers	5,00%	Natural Stones-Portuguese Exports in €_2020 (Assimagra)	4
				5,00%	Industrial production, annual percent change	
				7,00%	Stone_Total Exports_Structured Data (Cutting, Shaping and Finishing Stone industry)	
				3,00%	Gross Value Added by Mining, Manufacturing, utilities per capita (2012)	
					TOTAL NR OF VARIABLES	21

Appendix 4. Method used for missing variables

Type of variable	Method used	Name of the Variable
Qualitative	Average of similar countries	Trade freedom index Corruption perception index Political right index Quality of railroad Quality of Port Quality of Road Medium long-term political risk Human dev index Innovation index
Quantitative	CAGR	Economic growth GDP per capita Inflation rate Percent change in consumer price index Exchange rate per us dollars Unemployment rate Corporate tax rate Industrial production Net investment in non-financial asset Internet user's, percent of population Mobile phone Patent application by residents Charges for the use of intellectual property Tariff rate Stone total export Stone total import Export and sharpening polishing stone Import and sharpening polishing stone Percent income by the top 10 percent of earners

Appendix 5. Country ranking analysis with 54 variables

Country Name	Rank
United States	1
China	2
Switzerland	3
Germany	4
Japan	5
United Kingdom	6
Hong Kong	7
Netherlands	8
France	9
Canada	10
Singapore	11
Australia	12
Sweden	13
Denmark	14
Norway	15
United Arab Emirates	16
Iceland	17
Ireland	18
Finland	19
South Korea	20
Luxembourg	21
New Zealand	22
Belgium	23
Austria	24
Spain	25
Italy	26
Israel	27
Estonia	28
Czech Republic	29
Qatar	30
Poland	31

Country Name	Rank
Slovenia	32
Malta	33
Lithuania	34
Malaysia	35
Cyprus	36
Chile	37
Latvia	38
Slovakia	39
Croatia	40
Oman	41
Hungary	42
Kuwait	43
Romania	44
India	45
Thailand	46
Georgia	47
Bulgaria	48
Turkey	49
Russia	50
Greece	51
Saudi Arabia	52
Indonesia	53
Uruguay	54
Mexico	55
Panama	56
Montenegro	57
Kazakhstan	58
Costa Rica	59
Vietnam	60
Armenia	61
Azerbaijan	62

Country Name	Rank
Peru	63
Morocco	64
Serbia	65
Jordan	66
Albania	67
Belarus	68
Philippines	69
South Africa	70
Colombia	71
Dominican Republic	72
Namibia	73
El Salvador	74
Ukraine	75
Mongolia	76
Egypt	77
Moldova	78
Brazil	79
Bosnia and Herzegovina	80
Ghana	81
Jamaica	82
Tunisia	83
Paraguay	84
Guatemala	85
Honduras	86
Kenya	87
Ecuador	88
Senegal	89
Bangladesh	90
Argentina	91
Algeria	92
Pakistan	93
Nigeria	94
Angola	95

Appendix 6. Country ranking analysis with 21 variables

Final Ranking (21 Variables)									
Country	Final Rank	Country	Final Rank	Country	Final Rank	Country	Final Rank	Country	Final Rank
United States	1	New Zealand	21	Russia	41	Morocco	61	El Salvador	81
China	2	Singapore	22	Turkey	42	India	62	Namibia	82
Germany	3	Luxembourg	23	Slovakia	43	Panama	63	Jamaica	83
Switzerland	4	United Arab Emirates	24	Chile	44	Brazil	64	Tunisia	84
France	5	Qatar	25	Croatia	45	Belarus	65	Kenya	85
Japan	6	Israel	26	Latvia	46	Uruguay	66	Paraguay	86
United Kingdom	7	Finland	27	Kazakhstan	47	Jordan	67	Guatemala	87
South Korea	8	Hong Kong	28	Greece	48	Dominican Republic	68	Senegal	88
Netherlands	9	Kuwait	29	Romania	49	Ghana	69	Ecuador	89
Australia	10	Poland	30	Azerbaijan	50	Mongolia	70	Honduras	90
Sweden	11	Czech Republic	31	Armenia	51	Egypt	71	Argentina	91
Denmark	12	Slovenia	32	Georgia	52	Peru	72	Bangladesh	92
Norway	13	Malta	33	Serbia	53	Colombia	73	Nigeria	93
Ireland	14	Estonia	34	Bulgaria	54	Moldova	74	Pakistan	94
Canada	15	Oman	35	Montenegro	55	Indonesia	75	Angola	95
Spain	16	Malaysia	36	Thailand	56	Bosnia and Herzegovina	76		
Iceland	17	Lithuania	37	Vietnam	57	Ukraine	77		
Italy	18	Hungary	38	Albania	58	Philippines	78		
Belgium	19	Cyprus	39	Costa Rica	59	South Africa	79		
Austria	20	Saudi Arabia	40	Mexico	60	Algeria	80		

Appendix 7. Final Cluster Analysis

Cluster 1									
Sub-Cluster 1		Sub-Cluster 2		Sub-Cluster 3		Sub-Cluster 4		Sub-Cluster 5	
Country	Rank	Country	Rank	Country	Rank	Country	Rank	Country	Rank
Croatia	45	Indonesia	75	Colombia	73	El Salvador	81	China	2
Slovakia	43	Vietnam	57	Ukraine	77	Honduras	90		
Romania	49			Mexico	60	Guatemala	87		
Bulgaria	54			South Africa	79	Egypt	71		
Cyprus	39			Panama	63	Philippines	78		
Greece	48			Belarus	65	Dominican Republic	68		
Estonia	34			Costa Rica	59	Namibia	82		
Lithuania	37			Uruguay	66	Paraguay	86		
Latvia	46			Chile	44	Jamaica	83		
Hungary	38			Bosnia and Herzegovina	76	Tunisia	84		
Poland	30			Jordan	67	Argentina	91		
Czech Republic	31			Peru	72	Ecuador	89		
Slovenia	32			Albania	58	Brazil	64		
Malta	33			Montenegro	55				
				Serbia	53				
				Moldova	74				
				Morocco	61				
				Armenia	51				
				Georgia	52				
				Kazakhstan	47				
				Russia	41				
				Malaysia	36				
				Thailand	56				
				Turkey	42				

Cluster 1							
Sub-Cluster 6		Sub-Cluster 7		Sub-Cluster 8		Sub-Cluster 9	
Country	Rank	Country	Rank	Country	Rank	Country	Rank
Oman	35	Qatar	25	Algeria	80	Nigeria	93
Saudi Arabia	40			Angola	95	Pakistan	94
Kuwait	29					India	62
Azerbaijan	50					Kenya	85
Mongolia	70					Ghana	69
						Senegal	88
						Bangladesh	92

Cluster 2									
Sub-Cluster 10		**Sub-Cluster 11**		**Sub-Cluster 12**		**Sub-Cluster 13**		**Sub-Cluster 14**	
Country	Rank	Country	Rank	Country	Rank	Country	Rank	Country	Rank
Israel	26	Luxembourg	23	France	5	Ireland	14	United States	1
South Korea	8	Switzerland	4	Spain	16				
		Austria	20	Netherlands	9				
		Sweden	11	United Kingdom	7				
		Denmark	12	Japan	6				
		Finland	27	Germany	3				
		Belgium	19	Italy	18				
		Australia	10						
		Canada	15						
		New Zealand	21						
		Iceland	17						
		Singapore	22						
		Norway	13						
		United Arab Emirates	24						
		Hong Kong	28						

Appendix 8. Subcluster description

Cluster 1	**Sub-Cluster 1**	This subcluster is composed by 14 European countries with similarly low values of Stone Imports/Exports, Total exports being and Total imports.
	Sub-Cluster 2	This subcluster is composed by 2 Southeast Asian countries that have very low GDP per capita, where only 10% of the population has income above 1million, low registered charges for the use of Intellectual Property. When compared to other subclusters, it has low exports/imports of stone.
	Sub-Cluster 3	This cluster is the biggest one, being composed by 24 countries from Europe, South America, Asia, and Africa, being the most heterogeneous subcluster in geographical terms. When compared with the other subclusters, the variables: % of people with income > 1 million index, Stone total imports and Gross value added by mining and manufacturing are very low, with averages of 2,29; 2,26 and 3,47 respectively.
	Sub-Cluster 4	This subcluster is composed by 13 countries from South America, Africa, and Asia. These countries are low ranked and present below average values on the variables: Stone total exports, Natural Stone Portuguese Exports, % of people with income > 1million index, and Industrial design, when comparing to the other clusters.
	Sub-Cluster 5	This subcluster is composed by China, which is ranked as the second-best country. Although it scores 100 in Stone total exports, Gross value added, and Industrial design, it scores 1,93 in Stone Total Imports and 4,47 in Gross value added by mining. Portuguese countries have exported to this country, scoring 96,34 in Natural stone Portuguese exports.
	Sub-Cluster 6	This subcluster is composed by 5 countries from Asia, Middle East, and Africa that perform similarly below average on the variables: Industrial Design, Stone total imports/exports, and Gross value added by construction, when comparing to other subclusters. The better ranked country is Kuwait, which has the best value in Total natural resource rents, and scores 99,88 in internet users percent of population variable.
	Sub-Cluster 7	This subcluster is composed by Qatar, which ranks 25 in the country ranking analysis. It is the best country (scores 100) in the variables: Net investment in non-fincial assets, Internet users percentage of population, and Gross value added by mining.
	Sub-Cluster 8	This subcluster is composed by 2 African countries that score similarly low on Ease of doing business, charges Intellectual Property, % people with income > 1 million, and Stone total exports. These two countries are at the bottom of the country ranking analysis.
	Sub-Cluster 9	This subcluster is composed by 7 Asian and African countries that rank low in country ranking analysis. The countries are similar in having low GDP per capita (1,39/100), Gross value added by mining (1,33/100), and Natural stone of Portuguese exports (1,59/100).
Cluster 2	**Sub-Cluster 10**	This subcluster is composed by 2 countries from Asia and Middle East, belonging to the first quartile of the country ranking analysis. The cluster is characterized by above average values in Environmental Performance Index (70,52/100), Ease of doing business (89,32/100), Internet users % of population (91,22/100), and R&D (98,59/100). The cluster scores low in Stone total exports (1,05/100), Natural stones Portuguese exports (2,07/100), and Total natural resources rent (1,23/100).
	Sub-Cluster 11	This subcluster is composed by 15 countries from Europe, Middle East, Asia, Oceania, and North America which ranked below 30 in country ranking analysis. The best ranked country is Switzerland. The subcluster is characterized by scoring high in: Internet users (93,03/100), Ease of doing business (88,98/100), Political stability and absence of violence (84,31/100), and Logistics Performance Index (83/100), although they scored low in Stone total exports (1,46/100).

	Sub-Cluster 12	This subcluster is composed by well ranked countries where 6 are European countries and the other is Japan. This is the best cluster country-ranking-wise. The best ranked country is Germany, followed by France and then Japan. The cluster is worst at Total natural resources rent (1,37/100), which is natural since Europe does not have many natural resources area (mining, quarrying) and instead Europe imports from other countries. They rank high on Ease of doing business (82,8/100), on Internet users % of population (87,13/100), Environmental Performance Index (88,85/100), and Logistics Performance Index (85,73/100).
	Sub-Cluster 13	This subcluster is composed by Ireland, which scores high on political stability (82,68/100), Ease of doing business (87,06/100), Internet users % of population (83,85/100), and Charges for the use of Intellectual Property (100/100), although it scores low on Stone total exports (1,26/100), Gross value added by construction (1,32/100), and % people with income > 1million (1/100).
	Sub-Cluster 14	This subcluster is composed by the United States, which is first in the country ranking analysis. It scores high on Ease of doing business (97,19/100), Internet users percentage of population (88/100), Logistics Performance Index (81/100) and it is the best country in Stones total imports (100/100). Nevertheless, it scores low in Stone total exports (2,7/100) and Total natural resources rent (2,63/100).