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INTERNATIONALISATION PLAN FOR IMEGUISA PORTUGAL – IN-DEPTH ANALYSIS OF CZECHIA AND LR ON INTERNATIONAL MARKET SELECTION FOR SMALL FIRMS

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1 Abstract

This paper investigates an internationalisation strategy for Imeguisa Portugal, an SME focused on developing and producing intralogistics solutions for the automotive industry. Following a company's situation analysis, custom-designed country selection process, in-depth market analysis and entry mode selection process, a well-structured exportation plan to Mexico was outlined and deemed the most suitable move for Imeguisa. A marketing plan and financial forecast were further performed and complemented by actionable recommendations to guarantee its success beyond national borders.

As part of the report, a literature review on international market selection for small firms and an in-depth analysis of Czech Republic were conducted.

Keywords: Internationalisation Plan, Market Selection, Entry Modes, Marketing Plan, Financial Forecast, Strategy

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2 Introduction

The global intralogistics industry is booming with the race to cost reduction and companies trying to become as efficient as possible. With the rapid growth of the industry in different countries, companies need to take advantage of this opportunity to expand. The best way to exploit this global increase is to internationalise. Internationalising happens when a company increases its footprint or captures market share outside its domestic market (Hayes 2021). Imeguisa is a Portuguese company that operates in the intralogistics industry. The aim of the research is to analyse the company's current situation and the market it operates in. In addition, the most attractive international opportunity will be determined, and recommendations will be given for the process. In the original analysis, the strength and weaknesses of the company will be studied among many other strategic frameworks. For the overall industry, a market forecast, and a deeper industry inspection will be done. To determine the different opportunities for the company, the IMS "Country Clustering" and "Country Ranking" approach will be performed by collecting and analysing a wide range of data to finally rank markets based on their attractiveness. When it comes to the final recommendation that will guide further strategic decision making, an implementation plan will be given with an entry-mode strategy, a marketing plan, and a financial forecast. This will then determine the feasibility of the project. Due to the company's limited resources, Imeguisa does not have a strategic team assigned to

evaluate growth opportunities for the company. Although, the company is currently experiencing limited growth, it could benefit from opportunities in different markets. The topics tackled in this research are the readiness of Imeguisa to internationalise, the most attractive opportunities for the company and the implementation of the project. The structure of project follows the chronological order of the carried-out work from the company and industry analysis, all the way to the final recommendation.

3 Research Methods

In order to reach provable and valuable conclusions, various qualitative and quantitative research methods were employed for the present internationalisation project. Therefore, data and information were collected, organised in usable formats, and analysed to generate new information and insightful findings for developing the project at hand. Secondary data was used from reliable sources such as Governmental Bodies, The World Bank, Orbis, MarketLine, Statista, and Statzon. Additionally, Imeguisa, represented by Product Manager Marta Filipe, was a valuable source. Documents regarding Imeguisa's company structure and product portfolio were initially provided.

Little's MCAR helped to prove that missing data did not follow any pattern and the MICE (Multiple Imputation by Chained Equations) was used to account for missing values in the data set. Machine learning algorithms were also used to input missing values while Pearson correlation was used to identify highly correlated variables and exclude them from further analysis. Z-Scores were then used to standardise the data so that it could be compared across different variables. K-Means++, also employed, is an algorithm commonly used for country cluster analysis, which groups countries based on their similarities in the predefined variables. Finally, weighted averages were employed for country ranking analysis, allowing us to compare countries according to their performance throughout the variables. Competitors were grouped together according to certain variables by conducting a cluster analysis. All the above was done

using Excel, Python and SPSS.

During the semester, meetings were held, and correspondence exchanged with the company's chosen representative to address critical issues and receive feedback to align the team's approach with Imeguisa's interests and maximise the project's utility to the company. Such meetings were particularly important for ascertaining selection criteria and narrowing down countries, as well as for the broad topics of Marketing and Finance.

4 Literature Review

4.1 International market selection (for small firms)

The following literature review covers the theoretical underpinnings of international market selection for small enterprises. Small firms have played a glaring role in the local, national, and international economies, considered "essential for entrepreneurial activity, innovation, job creation and industry dynamics" (Shepherd and Wiklund 2005, 1) due to their clear dominance in most business landscapes. Small and medium-sized businesses (SMEs) are heavily encouraged to internationalise, particularly by the government, to remain competitive and endorse their financial health (KnighT, Durham, and Locke 2001; Evers 2010). Concentrating on a saturated niche market, the dominance of a significant rival or the entry of large firms providing equivalent products or services in the local market have propelled a global expansion (Buckley 1989). Furthermore, spontaneous orders commonly initiate export actions (Moen 1999) or the perception of export benefits (Papadopoulos and Denis 1988).

Entering the foreign market for the first time can be especially challenging for small enterprises as idiosyncratic factors heavily influence the strategic decision-making process. For instance, the business owner's personal preferences and goals, resistance to change (Liberman-Yaconi, Hooper, and Hutchings 2010) and the company's resources availability and capabilities – expressed in the Resource-based theory (Christensen 1991; Fahy 1998) – had stood as the central factors. Company resources may involve know-how, existing networks, innovation, and

physical and financial resources. According to Knight and Cavusgil (2004), financial resources are the key or, at least, the most noticeable factor when distinguishing large enterprises from small ones. Indeed, differences in the resources available might determine the tendency, process, and mode of international market entry (Morgan R.E, Katsikeas C.S 1997).

While suitable for large companies, the choice of highly systematic methods based on normative theories seems to be unviable and costly for small management structures. The method requirements might not match the company's resources - elevated levels of capital investment and commitment, willingness to devote time and personnel - and the company's goals (Stray, Bridgewater, and Murray 2001). The Country Cluster and the Country Ranking are considered the most effective statistical methods for the screening phase in the systematic process (Andersen and Buvik 2002). In many cases, small firms may find identifying new markets too challenging, driving them to give up on internationalisation (Fish and Ruby 2009) and to focus strategically on supplying their local market (Westhead et al. 2002).

Brouthers and Nakos (2004) reported that "smaller companies that systematically approach international markets appear to be more successful performers than small enterprises using a more intuitive or ad hoc approach". Nevertheless, only a reduced number of SMEs use systematic methods for the export market, given the complexities and the need for more data collection (Malhotra and Papadopoulos 2007; Papadopoulos and Denis 1988). SMEs conduct generally non-systematic, strongly personalised and belief-drive international market selection processes (Knight and Liesch 2016; Trudgen and Freeman 2014; Iazzi et al. 2015). Decision-makers of small firms depend on a limited amount of knowledge about the foreign markets (Simon 1987), predominantly adopting passive-search and low-key techniques to collect and analyse data under heuristic rules. Due to the risk avoidance and unstructured decision settings, they are more likely to adopt intuition as the core construct for the market selection process, leaving the power on "gut feeling" (Liberman-Yaconi, Hooper, and Hutchings 2010) or on

familiarity with the home country (Andersen and Buvik 2002).

When IMS techniques with a lower degree of systematisation are favoured, decision-makers may experience cognitive biases that prevent them from selecting the highest potential or circumventing uncertain-perceived alternatives (Das and Teng 1999). The decision-makers are more prone to ignore information relevant to other goals in favour of personal subjective goals (prior hypotheses bias). They tend to limit one's consideration to a select few options (exposure to limited alternatives bias) and promote using a few disjointed factors instead of formal estimating methods and statistical models (intensity to outcome probabilities bias). Subsequently, the firm might engage in a flawed internationalisation process in the long run with a feeble international performance, in terms of markets accessed and technology acquisition (Malhotra and Papadopoulos 2007).

Although some scholars support a positive correlation between the systematic use of IMS and internationalisation triumph (Brouthers and Nakos 2005; Ozturk, Joiner, and Cavusgil 2015), others emphasise the importance of flexibility, different perspectives, and custom-designed analysis (Kumar, Stam, and Joachimsthaler 1994; He and Wei 2011). Lages' findings reveal that relationship capabilities (Lages, Silva, and Styles 2009), the flow of communication (Crespo, Griffith, and Lages 2014), information sharing and communication quality (Lages et al. 2005b), and interaction within the network (Lages, Fonseca, and Miguel 2018) affect international performance. Hence, combining systematic and behavioural IMS techniques can benefit small companies (Marchi, Di Maria, and Ponte 2014; Macdonald et al. 2016) by including a broader set of variables aligned with the company vision and specific desires of the owner (Gripsrud, and Benito 2005). Small businesses face numerous constraints (e.g., team capabilities, management requirements, time, and financial resources) with particular established practices. Consequently, small firms can leverage the Value Creation Wheel meta-framework to minimise risk and grow in foreign markets. This innovative and customised

methodology can filter and rank markets with the highest potential while embracing insights from internal and external stakeholders. In this way, the chance that decision-makers of small companies overlook a highly lucrative market is diminished, allowing them to investigate reasonable and more suitable international markets.

In conclusion, this Work Project follows mainly a systematic approach, by employing the Country Cluster and Country Ranking as the preferable statistical methods for IMS, tailored to the appropriate managerial restrictions and stakeholders' expectations.

5 Strategic analysis of the company's situation

5.1 Firm overview and project background

5.1.1 Profile and management

Founded in 1994, Imeguisa Portugal focuses on the development and production of Intralogistics solutions. It was born as part of the Imeguisa Group, which in turn was founded in 1954 and headquartered in Guipuzcoa, Spain (Imeguisa Portugal 2022a). As per Imeguisa's Product Manager Marta Filipe, although Imeguisa Spain currently holds approximately half the capital of Imeguisa Portugal, the former is independent in matters of management, decision-making, strategy, and finances. From here on, the Portuguese entity will be referred to simply as 'Imeguisa', with no ultimately owned subsidiaries and no ultimate global owner itself. The only two current shareholders with no majority ownership are *Industrias Metalicas de Guipuzcoa SA* and *Imeguisa Portugal – Industrias metalicas Reunidas S.A.* (self-owned capital), holding a 50% stake each (Orbis 2022). According to Filipe, Imeguisa is in the process of becoming fully Portuguese, with no Spanish participation.

Currently presided by Sir Orlando Brito, Imeguisa Portugal is structured into five central departments – Commercial, Procurement, Human Resources & Finance, Infrastructures, and Operations. The Commercial department also encompasses R&D and Marketing activities. In turn, the Operations department is the most complex of the bunch, divided into three

subdepartments – Planning, Production, and Automation & Robotics. Refer to appx 1 for Imeguisa's organisation chart.

The enterprise currently specialises in supplying customised Intralogistics solutions for businesses, serving mainly the Automotive industry. Clients include Mercedes-Benz, BMW, Audi, Nissan, Renault, Seat, General Motors, and Continental, among many others. In addition to a broad portfolio of solutions, encompassing handling & conditioning, transport systems, and storage, the company also provides a set of services, from industrial consulting, to inspection, to the maintenance of shelves (Imeguisa Group 2022a).

Numerous partnerships have been established by Imeguisa, namely with Volkswagen Autoeuropa, Instituto Superior Técnico, and CEIT (Centro Estratégico de Inovação Territorial) by Asseco. These collaborations have allowed the company to expand its product portfolio and meet the market's latest demands. Albeit being mainly active in the Automotive industry, Imeguisa aims to venture into other industries and sectors, namely Food and Retail.

Headquartered in Palmela, Setúbal, Imeguisa stands as one of the manufacturing plants for the Imeguisa Group, which has further production facilities in Spain and Morocco. Moreover, Imeguisa aims to increase its grounds soon, having 18.000 square meters of approved area for the construction of new facilities, with a further expansion subject to approval. However, such intentions were thwarted by the Covid-19 pandemic.

The company is governed by an Integrated Quality, Environmental and Safety Management System in accordance with the international standards established by ISO 9001(Imeguisa Group 2022a), which sets forth the criteria for a system based on several principles, including a strong customer focus, the engagement and implication of top management, the process approach, evidence-based decision-making, and continual improvement (ISO n.d.). Such QMS contributes more significantly to UN Sustainable Development Goals 1, 9, 12 and 14 – No poverty; Industry, Innovation, and Infrastructure; Responsible consumption and production;

Life below water, respectively (ISO n.d.). As for implementation, Imeguisa follows the ISO 14001 guidelines, thereby having a systematic approach for measuring and enhancing its environmental impact, regulated, and certified by LLOYD'S.

5.1.2 Product/business portfolio

As a Group, Imeguisa focuses on global intralogistics solutions with the aiming of enhancing its customers' productivity and efficiency. With more than 60 years of experience, Imeguisa is inspired by the challenges of its customers' demands (Imeguisa Group 2022a).

The business portfolio has four categories: **Transport Systems, Handling & Packaging, Storage,** and **Industrial Furniture**. The first two are operated under the name of a new brand that Imeguisa Group specially created for intralogistics technical solutions: the BOOMERANG intralogistics solutions (Imeguisa Group 2022a).

The **Transport Systems** section counts two groups of products, the *ModulMove-system*, including Automatic Guided Vehicles (AGVs) and Autonomous Mobile Robots (AMRs), and the *ModulPipeTransport-system*, with the E-Frame, H-Frame, and I-Frame (Imeguisa Group 2022b). In addition, the *ModulMove-system* has incorporated a monitoring and management platform, enabling wireless communication with the devices, status reports, traffic control, user control, and database recording. In the table below, the description of these products.

Designation	Product	Characteristics
ModulMove-system	AGV (appx 2)	- wide variety of options with high degree of autonomy and efficiency - programme to follow different routes - chromatic code, RFID's cards, or free navigation mode (AMR) - fully customised (3), versatile, autonomous, and ease to integrate in processes - ability to operate 24/7
	Platform	- monitoring and management - wireless communication - status reports, traffic control, users' control, and database to future analysis
ModulPipeTransport-system	E-Frame (appx 4&5)	- flexible solution for heavy weights handling, up to 1000 Kg - hydraulic lifting, manually operated system - electric lifting, semi-automatic electric system command by the operator - extensible, fully automatic system, free from human operation, connected to an AGV
	H-Frame (appx 6)	- optimised cargo loading/unloading, since it's done on the same trip - two roller tracks facilitate the cargo movements - all the advantages of the *ModulPipeTransport-system* in one compact model
	I-Frame (appx 7)	- best-seller within this line - complex, efficient, and profitable - I-Frame simple or I-Frame double - agile and ease to use

Table 1 - Imeguisa's Transport System products

The **Handling & Packaging** section includes distinct products, the *Karakuri Kaizen solutions*, with *the ModulPipe-system* and the *ModulPipeSmart-system*, the *ModulPacking-system*, the *Shop-Stock & Ponto Único*, and the *Transtocker*. To meet the challenges of Lean Manufacturing, Imeguisa felt the need to partner up with SUS Corp., to develop and produce the *Karakuri Kaizen* solutions, aimed at intralogistics process optimisation. Further, Imeguisa created *ModulVirtual-system*, a service based on virtual 3D simulation, allowing to model and improve existing and future systems, thus creating the best Digital Twin process (Imeguisa Group 2022a). The figure displays the description of the Handling & Packaging products.

Figure 1 - Imeguisa's Handling & Packaging products

For **Storage** options, Imeguisa offers a set of Rack & Containers (appx 15) that can be specified to the last detail, as well customised Industrial Racking (appx 16) for the most demanding spaces (Imeguisa Group 2022a). Lastly, Imeguisa's portfolio also comprises **Industrial Furniture**, from industrial cabinets to industrial benches, and closets (Imeguisa Group 2022a).

It is also important to note that the Shop-stock, the Ponto Único, the Transtocker, the Racks & Containers, and the Industrial Furniture are exclusively produced by Imeguisa Spain.

To respond to the industry's current challenges, BOOMERANG, has teamed up with CEIT, by Asseco, offering the best technological solutions. As a result, more products i.e., autonomous

forklift trucks, are expected to be developed in this scope. (Imeguisa Group 2022b).

In summary, Imeguisa's portfolio is characterised by cutting-edge and customised technologies, in line with the Industry 4.0 pillars, increasing productivity and competitiveness of intralogistics processes and helping to prepare its clients for future challenges.

5.1.3 Operations, positioning, and strategy

Operations at Imeguisa unfold according to the structure of the respective department, already briefly explained in **5.1.1**. The Production subdepartment is split into Light Production, Heavy Production, Maintenance Contracts, and Assembling. Both the Planning and the Production subdepartments are headed by Bruno Costa, allowing for an agile articulation of both domains. In turn, the Automation & Robotics subdepartment, headed by João Mendes, counts with 11 employees, almost half of Imeguisa's workforce and the largest share of personnel ascribed to any company division.

The driving force behind the firm's activity is Imeguisa's vision to *"be the reference company regarding Intralogistics solutions, thereby increasing the competitiveness of clients through the implementation of specific solutions as an integral part of their performance"* (Imeguisa Portugal 2022b). Its mission is, in turn, to *"passionately and responsibly develop innovative technological solutions, which are unique and adapted to the reality of each client, with respect for their culture, values and objectives"* (Imeguisa Portugal 2022b).

A pioneer in innovating storage shelf systems, through the application of innovative engineering that allowed their assembly without screws, the group's engineering and industrial activity focuses on the innovation of the use of metallic materials for various purposes (Imeguisa Group 2022a). Such innovative spirit is core in Imeguisa's product development within a range of industrial solutions designed to optimise storage and logistical systems. This is evidenced namely by the patent Imeguisa holds for the I-Frame logistical train within the *ModulPipeTransport-system* product range.

Claiming to be "*your technology partner for industrial innovation*" (Imeguisa Portugal 2022c), Imeguisa positions itself to achieve a competitive advantage over rivals through the integration of innovation in the products and intralogistics solutions offered. In this sense and as previously mentioned in chapter **5.1.1**, partnerships are particularly valuable for Imeguisa as they are one of the means through which the firm expands its product portfolio and ensures the market's latest demands are catered to promptly. The other fundamental way in which Imeguisa seeks to distinguish itself from its peers lies in the customer service it provides. Attending to customers' needs, the full project is carried out (development, installation, assembly, maintenance), so clients get a complete service (Imeguisa Portugal 2022c). By ensuring specialised assistance throughout the entire customer journey, including the after-sales period, Imeguisa aims to maximise its solutions' utility, life cycle, and client satisfaction.

Imeguisa pursues a differentiation strategy based on the products' uniqueness and the quality of services provided, which are customised to the specific needs of each buyer. This strategy falls under the greater objective of maximising efficiency while delivering excellent quality intralogistics solutions. A customer-centric approach serves as a foundation for Imeguisa to continuously improve customer satisfaction, loyalty, and, ultimately, retention. Creative engineering and the latest available technologies are employed in the production processes in order to boost flexibility and decrease response time relative to customers' needs. Hence, Imeguisa anchors on its product and service differentiation strategy to maintain current performance, achieve higher numbers and grow past the Portuguese borders.

5.1.4 End-user product/service to be internationalised

After a meeting with Marta Filipe, product manager at Imeguisa, it was decided that the team's focus would fall solely on the *ModulMove-system*, specifically the AGVs and the AMRs. This decision is based namely on these products' high adaptability to other markets compared to other products provided by Imeguisa.

Since the AGV/AMR can be customised to the client's needs, the company could leverage its capabilities and competitive advantage, by internationalising these 'solutions' to new markets. Moreover, these robots define the innovative intralogistics industry, so the entry into a new market must be done with the highest potential products. Given Imeguisa's lack of resources, internationalising the entire portfolio is considered unviable, hence the choice of products representing Imeguisa's capabilities to the fullest. Even so, the internationalisation of the *ModulMove-system* is somewhat complex, as it requires more specialised technical assistance. Therefore, Imeguisa needs to consider local partners to ensure the after-sales service for this product line.

5.1.5 Financial overview

Imeguisa's financial health was analysed to assess internationalisation readiness, providing a more in-depth look at the company's internal operations and capabilities to generate wealth. At this stage, it is essential to mention that the FY of 2022 was not considered since the fiscal year was still undergoing during this project. Besides, this financial overview considered information from the Income Statement (appx 17), the Balance Sheet (appx 18) and a set of ratios (appx 19) retrieved from Orbis. To better understand Imeguisa's positioning in the industry, the results of 4Lean, an innovative firm providing Lean solutions in Portugal, were used due to the similarities with Imeguisa in terms of size. The following report comprises a two-currency approach with the U.S. dollar and euro, adopting the currency displayed in the information of the sources used. For the sake of simplicity, a conversion rate of 1 US$ = 1€ can be assumed for the forecasted period (Google Finance 2022).

The first step is to analyse some relevant aspects of the company's Income Statement over the last five years. The Operating Revenue, which is 99% composed of Sales, has steadily decreased at a CAGR of -11.98% over the past five years, reaching 2.004.619€ in 2021. Although the pandemic crisis seems to be a plausible reason for these results, it is not enough

to explain the decrease in sales over the last half-decade, suggesting that other factors were responsible for this outcome. One cause can be the intensity of rivalry due to the prominent players and the entry of new competitors due to the demand surge for intralogistics solutions. The customisation of Imeguisa's products and the specificity of clients might be another reason, as they lead the company to become more intentional in production, reducing mass sales.

Looking at the cost structure, Imeguisa pursued a target cost reduction strategy intending to build internal capabilities and tackle the sales problem. Imeguisa was able to reduce by 52% the other operating costs category and 97% the financial expenses between 2018 and 2019. Consequently, the EBITDA rose 36%, followed by an increase of 98% in the net income during that period, regardless of the substantial decrease in sales revenues. At the end of 2020, both indicators decelerated to a growth rate of 4%, driven mainly by a massive increase in financial expenses (1851%). While in 2017, the profit margin reached 8% and the EBITDA margin 16%; over the next two years, the profit margin ranged from 16% to 17%, and the EBITDA margin was 24%. Despite the fluctuations in these figures, the return on equity was steady and relatively high (2017 ROE = 11% vs 2019 ROE = 11.5%), which is a signal of good financial health.

Although the critical operating costs kept declining at a high rate (-13%) over the next year, the Net Income collapsed by 50%, reaching its historical minimum of 196.231€ at the end of 2021. The main reason behind this result relies on the sharp decline in sales (12%) and the increase in employees' expenses (12,75%) and depreciations (36%). As expected, the profit margin decreased by almost 47%, accounting for 10%, in 2021, and the ROE dropped to 5%. Compared to 4Lean, Imeguisa presents an overall lower profitability performance, mainly in returning investment to shareholders, as 4Lean's ROE in 2021 was 8.7%, and historically, profits margins, since 4Lean had margins around 20%.

Over the past five years, Imeguisa's production efficiency has declined as the asset turnover dropped from 1.1 in 2017 to 0.5 in 2021. When compared to 4Lean's 2.2 in 2017 and 1.2 in

2021, it seems clear that Imeguisa should monitor its productivity, increasing efficiency by better use of the resources available. Nonetheless, Imeguisa presents a better situation in terms of negotiating better payment conditions and spending fewer financial resources, as historically, Imeguisa has a more extensive APP than ACP, i.e., receiving first from clients and then paying its suppliers (in 2020, APP = 137 days, while ACP = 41 days), thus equating lower pressure on the company. Contrarily, 4Lean has received from its clients after experiencing a riskier situation. In sum, Imeguisa's efficiency presents a medium score.

Imeguisa demonstrates a favourable liquidity situation, as it can pay more than 2.5 times the short-term obligations using the available assets, not showing a significant dependence on inventories (Breia, Mata, and Pereira 2014), as the inventories account for 20% of the available assets (in 2021 current ratio = 2.8 & liquidity ratio = 2.6). Despite the pandemic's impact, Imeguisa has been improving its liquidity since 2017 (2017 CR = 1.8 & 2017 LR= 1.7; 2020 CR = 2.5 & 2020 LR= 2.4). Although 4Lean demonstrates a slightly bigger ability to meet short-term obligations in 2021 and previous years, the high dependency on inventories represents a weakness (2021 CR = 3.5 & 2021 LR= 2.6). In 2021, Imeguisa recovered from the past negative values of working capital of Imeguisa, reaching a value of 600.000€. However, the competition does not show the same pattern, as 4Lean demonstrated growth in WC over the last five years (+900.000€ in 2021). As a result, Imeguisa exhibits a still limited ability to fund its current operations and invest in future activities to grow (Fernando 2022b).

The company's capital structure comprises mainly its own resources, as there is only 0,07€ of debt per each € of equity in 2021. The downward trend between 2017 and 2019 (2017 D/E = 0,24; 2018 D/E = 0,12; 2019 D/E = 0,07) was interrupted in 2020, with a substantial increase in debt, perhaps owing to the pandemic beginning (2020 D/E = 0,18). 4Lean presents a different approach as it does not resort to debt, using its own resources to finance operations, which might not be the best approach since, with debt, companies can leverage their value by resorting

to debt (Modigliani and Miller 1958). Besides, with positive cash flow over the years (+420.000€ in 2021), Imeguisa's liquid assets are growing, able to cover its obligations, reinvest in the business, return money to shareholders, and be prepared for upcoming challenges (Hayes 2022). Looking at Imeguisa and 4Lean, both companies have similar values, although 4Lean's CF has been deteriorating over the years, which could mean higher and continuous investments.

Lastly, Imeguisa is relatively safe in terms of risk, being more than 30% above the losses limit (MS = 33% in 2021), having a Break Even Point of 1.339.781€ in 2021. Historically, Imeguisa registered safety margins of around 40% in 2019 and 2020 and 27% in 2018. Looking at 4Lean, it has been exposed to slightly higher risk, as the margin of safety went around 20% and 25% over the last five years (in 2021, MS = 22%).

Overall, the promising financial performance of 2020 was sabotaged by the outbreak of Covid-19, crumbling in 2021. We believe this happened due not only to the long-lasting effects of the pandemic, but also due to adjustments made to effectively respond to the customer needs and the existent internal fragilities, such as the low working capital. Nonetheless, Imeguisa has shown resilience and responsiveness to the economic and industrial challenges, mainly in line with its direct competitors. In conclusion, although Imeguisa currently presents restricted financial resources, the firm is optimistic about reaching an advantageous financial position, ensuring a successful internationalisation strategy in the long run.

5.2 Market/Industry analysis

5.2.1 5Forces (considering the company's internationalisation goal)

Assessing the attractivity of the industry where Imeguisa currently operates – Intralogistics – is vital to outmanoeuvre their market rivals. The intralogistics industry is characterised by a prominent level of complexity, with varied markets (handling and transport, automated storage, picking) and a large client base (such as Automotive, F&B, E-commerce, and Retail firms).

In terms of the **competitive landscape**, the intralogistics market is highly fragmented, with

several major players (Siemens, Toyota Industries, Kion Group, and Tompkins Robotics) currently offering a wide range of products and constantly innovating their product portfolios to ensure ongoing customer relationships. As consumers have specific requirements in terms of speed and handling capacity, the incumbent players offer a range of options to meet these requirements, competing mainly on price and quality. Intralogistics companies are not expected to exit the market easily and quickly due to the excessive cost of switching between different technologies, which strengthens their commitment and competitiveness in the industry. Therefore, **extremely high rivalry** is found among existing competitors in this industry, primarily due to the presence of internationally renowned firms.

Next, regarding the **threat of new entrants**, it is necessary to ascertain how likely it is that new competitors will enter the market. Here, a distinction must be made between companies active in the industry but who have had little or no activity in the Portuguese market, and companies whose intention is to enter the industry and, consequently, the Portuguese market from scratch. In the case of the former, the threat is to be classified as high. These companies have strong industry knowledge and experience in the market, albeit not in Portugal. Of course, they bring the necessary technical expertise and have contacts with internationally active companies in the automotive industry. If a partnership works in one country, it is comparatively easy to continue it in another. Furthermore, especially for companies based in the EU (e.g., Siemens), there is hardly any hurdle, at least from a legal point of view. If one assumes that this does not require establishing of a branch office abroad and that the operation is conducted on a project basis, such scenario becomes even more likely. This is contrasted by the entry of a company that did not exist before, which is highly improbable. In addition to high capital expenditures, a high level of expertise is required, and existing patents and business relationships make market entry difficult and unrealistic. Overall, the probability of market entry is to be assessed as moderate, if not high, but only by already established players in

another geographical market.

Another force addressed in this model is **suppliers' bargaining power**, which captures the influence and power that suppliers have on the goods they supply in terms of price, quality, and availability. Key factors influencing this force are the number and size of suppliers, the product's complexity or uniqueness on the supplier part and the possibility of substituting the product with another one, on the part of the buying company. Overall, most components used at Imeguisa are not too complex, resulting in a high number of potential suppliers and the realistic possibility for Imeguisa to find substitutes from other companies. However, there are at least some elements for which Imeguisa faces a higher dependence on their suppliers. Briefly, the bargaining power of suppliers can be classified as medium. Accordingly, availability, quality, or price changes arising from other reasons other than the prevailing market conditions might occur for certain components, whereas others are easier to substitute.

As for the **bargaining power of suppliers** or, in other words: What is the market power of Imeguisa's existing and potential customers, and how does it affect Imeguisa's behaviour regarding pricing, customer service or product quality? Potential customers are limited to around 350 companies in the Portuguese automotive sector, and the product offered must meet the exact specifications and requirements of the demanding customers, after which differentiation potential is limited. Quantity-wise, the size of the orders is medium to small since it is not a mass product for the broad market. However, the value size of individual orders can be classified as high for such solutions. Customers expect functional solutions that increase efficiency in intralogistics, meaning that they are likely not very price sensitive. AGVs offer enormous savings potential of up to 20% of intralogistics costs of single parts and materials (Fusko, Rakyta and Manling 2017). For this reason, it can be assumed that companies pay close attention, and have information about different solutions. Switching to similar solutions from other manufacturers is a potential threat, whereby the switching costs vary depending on the

product category. Low differentiation potential, few buyers, and the potential to choose from a decent number of sellers makes the bargaining power of buyer's medium to high. If Imeguisa is to enter other sectors like Food and Retail, the bargaining power of buyers is decreasing.

Potential substitutes to the products offered by Imeguisa to tackle intralogistics challenges are conveyor systems, automated storage, and retrieval systems (AS/RS), autonomous mobile robots (AMRs), traditional forklifts and lift trucks whereby the latter two are not considered real alternatives for reasons of efficiency. However, AMRs are a natural substitute for AGVs since they have less limitations. While AGVs are restricted to a given and pre-set route within the production facility and are therefore only able to fulfil one very task AMRs do better. While one AGV can only transport goods from one set point to another predefined point, an AMR can bring goods from any point to any other point within the facility's boundaries (Benevides 2021). Hence, the initial investment cost might be lower and thus speak in favour of AMRs compared to AGVs. In conclusion, the threat of substitutes can be assessed as medium.

5.2.2 Consumer trends and forecasts

The intralogistics market reveals excellent prospects due to insurmountable demand for heightened productivity and efficiency across different industries. The global intralogistics market is projected to grow at an impressive CAGR of 15.5% from 2022 to 2032, reaching a value of US$415 billion by the end of the forecasted period (Fact.MR 2021). Both the Chinese and Indian markets are expected to grow at a rapid pace of more than 18% CAGR over the next ten years, outpacing the US, the current market leader, at 13.8%. Looking at the segments, the food & beverage industry seems to be the most attractive one, as it is forecast to grow at a CAGR of 16%, followed by the software market and industrial robots' segment, with a CAGR of 15.5% and 12%, respectively (Fact.MR 2021).

The Covid-19 pandemic has profoundly disrupted business and reshaped manufacturing processes across different industries, requiring a fast-paced digital journey to remain

competitive. Automation, supply chain digitalisation, and the explosion of e-commerce have been major bellwethers for the growth of intralogistics solutions. For instance, the introduction of cutting-edge technologies such as AS-ARs, driverless transport systems (e.g., AGVs) and other layers of automation in intralogistics management processes allow for an efficiency increase in every step of the process. Additionally, the availability of intralogistics solutions helps e-commerce companies ensure shorter delivery times and the timely delivery of products. Industries currently demand smart intralogistics solutions that provide safety, flexibility, scalability, and speed to remove the manual labour, error and repetitiveness associated with logistics. In addition, the widespread use of big data and 5G, and the Industrial Internet of Things (IIoT) as a reaction to the new paradigm of Intralogistics 4.0 enables better monitoring and analysis of warehouse performance in real-time and ultimately guarantees superior operational efficacy for both intralogistics manufactures and end-users.

Element Logic, a Nordic warehousing company, goes even further into detail and presents three emerging consumer trends shaping intralogistics – e-grocery, micro-fulfilment centres and automation as a service. These trends call for intralogistics companies to be highly adaptable and have a sustainable infrastructure to respond effectively to buyer demands.

Finally, environmentally friendly solutions that strive to reduce the carbon footprint will indeed impact future product supply, given the intense push from governmental organisations.

5.2.3 Key industry success factors

By taking a closer look at the industry, one will find certain factors whose presence is key to guaranteeing long-term success and sustainable competitive progress. One of these success factors is to offer products that have the potential to be applied to the specific needs of industries or companies. Achieving this balance opens much larger markets than specialising in one very industry. These added sales opportunities allow companies to exploit economies of scale and further grow. Whether and to what extent the range of services must be adapted to other markets

determines the advantageousness of such decisions. Imeguisa is currently assessing what adapting to other sectors will require, namely Food & Retail. In addition to the fifth largest sector in the intralogistics industry (Food), this step would also open the most prominent sector (Retail & E-Commerce) (Fact. MR 2022).

Another major success factor in the industry is product innovation capability, which in turn, is intricately linked to R&D and technical expertise. The constantly growing requirements and changes across all sectors and the efforts to make production processes more efficient mandate intralogistics manufacturers to develop their products constantly. As a result, a high need for sufficient funding, as research, talent acquisition and development of a market-ready product can require high funds. Although liquidity is generally regarded as a condition sine qua non, i.e., as an indispensable prerequisite for entrepreneurial activity, it should be emphasised that there may be an increased need for financial resources. Furthermore, it is not only essential to develop the right products, but also to develop them at the right time to not miss market opportunities and fall behind the competition. Imeguisa recently avoided such a situation by entering a partnership with another company and thus could offer essential product components in time. Strategic partnerships, including suppliers and customers, are vital in this industry.

5.2.4 PESTEL (considering the company’s internationalisation goal)

Considering Imeguisa's goal to penetrate the global market, conducting the PESTEL analysis is crucial to identify the various external aspects that affect the firm in the Portuguese market.

In the **political** sphere, Portugal is a stable parliamentary democracy, with a score of 1.03 (on a scale from -2.5 to 2.5) on the Political Stability Index of 2020 (The Global Economy 2020). Slow responsive administration, high bureaucracy (e.g., in getting the permits and licences), and tax burden are the critical factors inhibiting economic growth and compromising the Portuguese companies' capability to invest in state-of-the-art technologies that would facilitate entry into the international market. Over the last decade, the Portuguese government has taken

a progressive approach towards industrial SMEs, granting tax benefits, incentives, and deductions to encourage internationalisation and facilitate access to financing and the public procurement market. Indeed, the share of government-guaranteed loans in total SME loans has improved significantly, from 5.4% in 2009 to 23% in 2020 (OECD Publishing 2022e). Furthermore, in early 2017, the government introduced the "Indústria 4.0" programme, which promotes national reindustrialisation with a focus on competitiveness and valorisation of national production. In addition, Portugal has in place measures to implement the SME strategy and the Small Business Act (SBA), with the revision of its national digital skills initiative (INCoDe.2030) in May 2021 and its subsequent launch of the "Eu Sou Digital" program (European Commission 2022a).

Looking at the **economic** outlook, Portugal has made incredible progress in overcoming the pandemic-induced recession, with a GDP growth of 3.9% in the second quarter and a projected growth of 1.7% in 2023 (OECD Publishing 2022d). Portugal's growth potential has been losing pace as inflation reached values of 8.2% in the second quarter of 2022 due to a sharp surge in energy and food prices and aggravated shortages related to the Russian War (European Commission 2022a). Moreover, the prices in industrial manufacturing rose 19,6% (YoY growth rate) in September 2022, which can have an acute impact on business sustainability (INE 2022). Portugal's economy depends heavily on foreign trade, which accounts for 76% of GDP, with the manufacturing of transport equipment and related industries representing 16.3% in 2020 (World Bank 2021a). Although intra-EU trade accounts for 71% of Portuguese exports, new opportunities in emerging non-EU countries are gaining relevance, mainly in Portuguese-speaking nations (Angola and Brazil), China, Latin America, and North Africa.

SMEs have played a significant role in the Portuguese business landscape and economic prospects. SMEs accounted for 99.9% of all Portuguese businesses, capturing 76.2% of the labour force in 2020 (European Commission 2022b) and an investment volume of 82.8%

(OECD Publishing 2022d). Nevertheless, and despite recent improvements in this respect, access to finance remains an issue for Portuguese SMEs, primarily in terms of equity, and such a problem is aggravated by the persistent challenge of late payments (European Commission 2022b). The Portuguese automotive sector is vital for employment and exports (11% of the total exports in 2021) (International Trade Administration 2021). Nevertheless, the number of unfilled vacancies and labour shortages is increasing in all sectors, especially in manufacturing, transport, and storage, affecting the efficiency of the firms operating in these sectors and deteriorating the attraction and retention of talent.

Regarding **social** factors, the Portuguese setting is characterised by an ageing population with low skill levels, especially in the digital field, but a great openness to foreign cultures due to security. However, the Portuguese education system is gradually improving, as evidenced by the introduction of digital skills training and the increase in the number of graduates, especially in science and information technology. As the Portuguese youth is increasingly more qualified, tendentially low wages mean labour remains competitive cost-wise, attracting foreign employers. Conversely, Portuguese companies, especially SMEs, have a reduced ability to compete for both local and international talent. Additionally, the country's vibrant entrepreneurial environment is supported by numerous public measures, including the incorporation of entrepreneurship-themed courses into the education curriculum (European Commission 2022b).

Considering the **technological** perspective, the Portuguese government is deeply committed to digital transformation, with a total investment of 11.6 billion euros in technology. Similarly, the private is ripping for digital transportation, with an investment representing 68% of its total expenditure (IDC Portugal 2022). The emergence of technological innovations based on IoT (Internet of Things), advanced analytics, machine learning, and AI as well as a new category of Smart Operations Platforms, are greatly revolutionising the business and operations in the

manufacturing and industrial sectors. Improving the digital maturity of core manufacturing functions is a priority for industrial firms, which aligns with the Indústria 4.0 goal.

Concerning **environmental** factors, 2022 is on the cusp of a major shift in warehouse management as companies increasingly look at green warehousing processes. Companies are adopting biodegradable packaging material, optimal thermal insulation, and energy-efficient equipment to reduce their carbon footprint. Portuguese industrial SMEs can receive support from the public sector through the decarbonisation and circular economy credit line, as well as from private initiatives such as *Quadrantis Growth 4.0* and *Greenpower 4.0* Funds (BCSD Portugal 2021). Climate change can be a barrier to the decarbonisation project due to soil/air/water quality, natural resource availability and commodity prices.

Finally, notwithstanding the commitment to greater transparency, Portuguese businesses are hampered by structural and legal bottlenecks in the judicial system and the distrust in public procurement due to problems with direct awards and non-competitive procedures (OECD 2021). Regulations in the areas of data protection, security and labour are primarily in line with EU legislation. Legal requirements related to patent and copyright laws can affect industrial business. Nonetheless, conditions for a more favourable innovation and entrepreneurship environment are being settled (*Despacho n. º 6269/2021* and *Despacho n.º 11092-B/2021)*, which confer the recognition of 17 Digital Innovation Hubs (DIH), spaces aiming to help national SMEs and the Public Administration in the development of advanced digital skills and solutions (SGEconomia 2022). The Portuguese network of DIH is connected to its European equivalent, allowing for synergies, the further opening of markets, the facilitation of partnerships, and knowledge and experience sharing (Portugal Digital 2022).

In summary, the various PESTEL domains highlight significant market-dominating traits in Portugal that influence Imeguisa's business and operations, providing a foundational perspective for seizing new opportunities in foreign markets.

5.3 Firm specific advantage

5.3.1 Resources and competences (value chain)

In order to optimise Imeguisa's competitive advantage in the domestic and foreign markets alike, the company's resources and capabilities ought to be scrutinised.

Imeguisa has around 300 suppliers based in EU countries, the UK, Japan, South Korea, and China. Pertaining to distribution, as the SME ensures direct delivery of its solutions to clients in Portugal and abroad, third-party distributors generally take no part in its value chain. Although the transport costs are always carried by the client, transportation is arranged by Imeguisa if the customer firm is located in the EU (Incoterm DDP); whereas if the customer is based outside EU borders, it shall arrange transportation on its own (Incoterm EXW). Imeguisa's customer portfolio comprises firms operating in various industries, namely, Aeronautics (e.g., Embraer), Plastic molds (e.g., Grupo Simoldes), and Automotive, the latter making the bulk of the number of customers. In 2022, the SME served a total of 38 clients.

The Portuguese firm tailors to customers' specific needs, providing them with customised intralogistics solutions and associated services, thereby offering a superior quality **customer experience**. Such superiority rests upon the respect for the customer's operational needs and culture, as well as the provision of training services to all intervening parties with the purpose that they can autonomously control the entire installation and enjoy seamless integration of the new equipment provided by Imeguisa in their operations (Imeguisa Group 2022a). Further, preventive maintenance and repair services are also provided by the SME, only subject to payment after the end of the 1-year warranty period granted to each product.

The application of sophisticated technologies (e.g., 3D, virtual simulation) in product design and development processes compensates with the company's **strong innovation focus**, resulting in modern, hard-to-find products. Here it is worth mentioning the patent for the I-Frame logistic train within the *ModulPipeTransport*-system product range, held by

Imeguisa. According to Imeguisa's Product Manager, the average production time of equipment is 20 to 30 days. Several years of experience catering to the Automotive industry have equipped the firm with a distinctive set of capabilities, a **deep knowledge of the Automotive sector**, and a remarkable network of clients. As a Business-to-Business (B2B) player in the Intralogistics field, Imeguisa's primary goal is to increase its customers' productivity. **Access to diverse skillsets and know-how** through key partners facilitates Imeguisa in this task and assists the company in expanding its portfolio of solutions while meeting market demands in a timely fashion. The firm's innovation capabilities allied with projects pursued alongside industrial partners (e.g., Volkswagen Autoeuropa) and investigation partners (e.g., Instituto Superior Técnico) allow for the continuous development of industry-specific, ingenious, more efficient technological solutions which cannot be rivalled by many.

5.3.2 Country specific advantages (Porter's Diamond)

Porter advances that the industrial competitiveness of a company is directly affected by the economic environment of its home country (Porter 1980). Furthermore, if a country is stronger in one of the four factors of Porter's Diamon model, it will offer Country-Specific Advantages to the enterprises (Porter 1990). By conducting Porter's National Diamond Framework, we found that Imeguisa's home country Portugal provides several specific advantages, with demand conditions especially worth mentioning.

The first factor to be analysed is **firm Strategy, Structure & Rivalry.** Although Imeguisa is part of a group based in Spain, it is fundamentally independent. The strategy envisages that the fifty percent share the parent company currently holds will soon be transferred to Imeguisa. Despite the ongoing spin-off, it is possible to speak of positive synergy effects. A significant example of those synergies is that part of the product portfolio is sourced from the Spanish parent. In the past, the company has already cooperated with other companies to promote products and open new markets. Currently, the company is trying to establish the products in

new strategic business areas, such as the retail or food sector. Fierce competition can be seen all over the industry. There are numerous competitors within the Portuguese market, and the competitive situation is particularly fuelled by many large multinationals ready to enter the market. See 5.3.3 for concluding competitor analysis.

Related and supporting industries can be of critical importance for the development of a company. Portugal has rich deposits of mineral resources, mined in the country and partly exported. Metals in demand include tungsten, tin, chromium, and other alloy metals. In addition, large quantities of copper have been mined and exported since 1989. The dependence on energy imports is undisputed, with 80% of the energy consumed imported from abroad. Petroleum, especially coal, from which 25% of electricity is produced, must be imported. Since the 1980s, coal production has increased in the country while gas is imported from North Africa via pipelines. In addition, Portugal is increasingly trying to rely on renewable energy sources and therefore owns one of the largest wind farms in Europe and one of the largest photovoltaic parks in the world. Portugal produces a large amount of different goods, with regionally different clusters. Around Lisbon, oil refining, chemical industries, cement processing, automobile manufacturing and assembly, electronics manufacture, wood-pulp, cork production, and fish and beverage processing can be founded. Further north, in Porto, the focus is on textiles, footwear, furniture, wine, and processed foods. In other cities, one can also find the production of clothing, cutlery, electronics, plastic moulds, and machine tools. Finally, fuel and electricity production can be found in the port city of Sines (Encyclopædia Britannica n.d.).

Regarding **factor conditions**, with an average annual wage of 19.212€, Portugal provides one of the most affordable workforces within Europe, making it attractive for companies to produce goods and services in Portugal (Statista 2021b). Additionally, in terms of skilled labour, Portugal ranks close to countries like the UK, Belgium, and France and offers a sufficient level of expert workers, which, according to the European Skills Index (ESI), are needed in Tech

companies. For this assessment, ESI considers skills development, activation, and matching (CEDEFOP 2018). Imeguisa also states that it has partnered with institutions to spur innovation. The presence of such institutions represents favourable factor conditions.

Lastly, the **demand conditions** in the domestic market are very attractive, enabling growth, demanding constant innovation and advancement. In fact, Portugal is the 27th largest exporter of cars in the world (OEC 2022). AFIA (2022) shows that the Portuguese Automotive Components Industry accounts for 5.2% of the total GDP and 16.1% a substantial chunk of total exports of tradeable goods. Moreover, these 350 domestic companies spend 4.3 billion euros on investments annually. The Portuguese automotive industry is highly export oriented and its sales abroad account for over 80% of the industry's turnover (AFIA 2022). In turn, the Portuguese Automotive Industry had the highest revenue growth rate within the European Automotive Industry in 2020 (17,3%) and a 17,5% CAGR, the 3rd highest in 2021 (Senn-Kalb, Venugopal, and Stefan 2022), corroborating the beneficial conditions.

5.3.3 Firm competitive advantage (VRIO)

Given the above mentioned, Imeguisa's approach to maintaining and enhancing long-term performance stands primarily on the continued development of three axes: industry-specific knowledge, innovation, and customer experience.

Furthermore, evaluating Imeguisa's competitive advantages is fundamental, especially regarding their sustainability. Sustainable advantages depend on four aspects, if they are Valuable, Rare, Inimitable, and Organised – the VRIO framework (Barney 1991). Below, the company's main resources and competencies are assessed according to said framework.

Capabilities	Resources	Valuable	Rare	Inimitable	Organised	Value Creation
Customer Experience	Product Customisation	✓	✓			Temporary Competitive Advantage
	Specialised Services	✓				Competitive Parity
Network	Industry-specific knowledge	✓	✓			Temporary Competitive Advantage
Innovation	Patent I-Frame	✓	✓			Temporary Competitive Advantage
	Know-How	✓	✓	✓	✓	Sustainable Competitive Advantage
	Strategic Partnerships	✓	✓	✓	✓	Sustainable Competitive Advantage

Table 2 - VRIO Framework

When analysing the table above, Imeguisa's most significant and sustainable competitive advantages undoubtedly lie in its *innovation capability*, making Imeguisa an expert in the industry where it operates. Its *partnerships* enable the company to enhance processes, and thus deliver better products, through the acquisition of supplementary know-how. These specific resources add value for the customers while being hard to find, and difficult to replace. Besides, Imeguisa has the necessary processes to turn these resources into competitive advantages. On the other hand, there are other resources, such as *product customisation*, *industry-specific knowledge*, and the *I-Frame patent*, which are temporary, because although they may be challenging to match, it is possible to do so, and thus, sooner or later, some companies may possess the same advantage, and begin to offer similar customised products. Furthermore, as time goes by, competitors will also gain industry-specific knowledge, another explaining reason for the temporary nature of such advantage. Also of temporary nature is the patent(s) held by the company, given that it is subject to expiration. As for the *specialised services*, although they are valuable for customers (adding value through complementary services) and foster good relationships with clients, thereby also enabling the improvement of working conditions, they represent a competitive parity, given that they are not rare in the industry.

5.3.4 Competitor Analysis

In order to devise a successful competitive strategy for Imeguisa, it is necessary to first have a picture of the competitive landscape in Portugal and abroad.

The technique used was Clustering K-means ++, performed in python. The following aspects were taken into account when conducting each analysis, national and international: *size* – expressed in the variable "number of employees"; *financial situation* – expressed in the variables "operating revenue" and "net income"; *affinity level* of the solutions offered in relation to those offered by Imeguisa – expressed in the variable "product affinity"; "industries served" by type (19); "international presence", expressed in the number of countries in which a given

company operates. Thus, a total of 5 parameters were assessed.

For firms party to a group, values for "international presence" are respective to the group and not to the subsidiary itself. The main reason for this is that such companies enjoy numerous benefits from being integrated into a larger group, namely access to financing within an internal network of capital resources, increased brand awareness, and operational support, i.e., in internationalisation matters. For instance, subsidiaries of the same group selling different products in different countries can act as after-sales partners facilitating each other's exporting activities when products require after-sales services.

Size and financial data were collected via the Orbis platform. No data dated prior to 2020 was deemed relevant; thus, numerous companies could not be included in the study. Information relative to the remaining variables was gathered through the companies' official websites and, when necessary, reports or other official sources. The data set for the competitive landscape in Portugal was composed of 15 companies (including Imeguisa), whereas the set for its international analogous was initially composed of 41 companies, which were ultimately narrowed down to 38 due to missing values for 1 or 2 variables (see appx 20). All categorical variables were transformed into a numerical format. The variable *"product affinity"* followed a label encoding technique, while "industry served" was the one hot encoding technique. Further, all the variables were transformed into a standardised format (Z-score), and the Silhouette method (Kaufman and Rousseeuw 1990) was employed to identify the optimal number of clusters (appx 21 & 22). The following tables summarise the findings of both cluster analyses regarding the current national and international competition environments. Company-cluster lists and variables centroids are available at appendices 23 to 26. For reference, Imeguisa was assigned to cluster 2 in both analyses.

Cluster Id	Characteristics					No. of Firms
	Financial Indicators	Size	Product Affinity	Industries Served	Global Presence	
1	-	-	Medium to High	High (12) Automotive, Pharma, F&B, Manufacturing	Medium (20 -30+)	2
2	-	Small	-	Low to medium (2,4,7) Manufacturing, Automotive	-	7
3	High	Small	Low	Medium (5,6) Aerospace/Aeronautics, Construction, Mining	High (50-140)	2
4	Medium to High	-	High	Medium- high (6,8,9) Automotive, Pharma, F&B, Retail/Wholesale	-	4

- Non-defining Features Defining Features

Table 3 - National Competitive Landscape

The findings in Table 3 reveal that cluster 1 includes competitors that closely resemble Imeguisa's product offering, while catering to the highest number of industries within the sample, including those served by the Portuguese SME. As firms assigned to cluster 2 are similar to Imeguisa in terms of size, number and type of industries served, they can be identified as its closest peers. In turn, with low product affinity and non-serving of the automotive industry, cluster 3 firms display a larger competitive distance to Imeguisa. Finally, cluster 4 comprises those which can be perceived as top competitors in Portugal, given their high product affinity, overall high financials within the considered table and common industries served.

Cluster Id	Characteristics					No. of Firms
	Financial Indicators	Size	Product Affinity	Industries Served	Global Presence	
1	Highest	Largest	High	Medium (6,7,8)	Medium (26-41)	3
2	-	-	Medium-High	Medium (5-9)	-	20
3	Low	Small	High	High (14)	Medium (30+)	2
4	-	-	-	Low (Logistics & Warehousing)	Medium – High (12-100+)	7
5	Medium	-	High	Medium -high (9) Agriculture and FMCG	Medium (29)	3
6	-	-	Medium	Medium (6,8) Automotive, Electronics, Health & Wellness, Manufacturing, Plastics	Low- Medium (14-41)	3

- Non-defining Features Defining Features

Table 4 - International Competitive Landscape

As made apparent by Table 4, cluster 1 groups the largest and financially strongest companies, which, exhibiting high product affinity with Imeguisa, can be categorised as top competitors. Peers showing medium to high levels of product affinity and industries served can be found in

cluster 3, as well as in Imeguisa's own cluster 2. Greatly non-serving of the automotive sector and with a low to medium degree of product affinity, cluster 4 comprises distant competitors. Contrarily, catering to the Automotive industry, displaying affinity levels 3 and 2, respectively, close competitors should be considered in clusters 5 and 6.

In sum, the cluster analyses highlighted the existence of two markedly different types of rivals. Companies displaying relative 'competitive proximity', whether peers or top competitors, especially those belonging to a large corporate group, stand as Imeguisa's fiercest rivals and should thus be more carefully monitored. Conversely, companies in Table 1 cluster 3 and Table 2 cluster 4 represent a lesser threat to Imeguisa, as they serve different industries and the products taken to market are less similar to those offered by the Portuguese SME.

5.4 Diagnosis for internationalisation

5.4.1 SWOT matrix

The biggest **strength** of Imeguisa lies in its network of clients, e.g., General Motors, Fujitsu and Continental. The size and the international presence of the enterprise's network of clients can strengthen Imeguisa's geographical position. Furthermore, Imeguisa solutions are unique and tailored to its customers' needs, offering a superior quality customer experience. In turn, the customisation allows the company not only to extend its products to unexplored high potential industries but also makes the product portfolio not easily replaceable. In addition, Imeguisa has been present in the industry for over 20 years, which suggests that they developed the necessary skills to survive in this demanding industry.

A **weakness** of Imeguisa is the high dependence on partnerships for developing more innovative solutions. Hence, Imeguisa should aim at developing innovation, in-house and in a timely matter. Imeguisa's product portfolio does not sustain any competitive advantage over the large companies in terms of energy efficiency, functionality, and innovation. The company also has little experience transferring capabilities internationally, with few cases of reactive exports

of the I-Frame to Argentina, Brazil, and Mexico. Besides, the financial situation might not allow Imeguisa to proceed with a capital extensive expansion project. Finally, Imeguisa faces significant production capacity and managerial constraints, jeopardising the ability to satisfy potential foreign demand while serving the local market. By going abroad and exploring new industries, the company has the **opportunity** to strengthen its position and become more resilient to economic downturns. Due to the supply chain disruption in the last couple of years, the intralogistics market divulged immense growth opportunities, with increased demand for productivity and efficiency (See 6.2.3 Consumer trends and Forecast). With the 4th Industrial revolution on its way, manufacturers have adopted the concept of connecting non-traditional computing devices to the internet or private networks and have begun deploying large numbers of connected smart sensors in manufacturing centres. The main industries following this trend are where Imeguisa is currently offering expertise, such as manufacturing, transport, and logistics. As more industries are automatising their internal process management, the company can expand to new industries due to its customisable products.

The **threat** for Imeguisa is that the international landscape of the intralogistics market cannot easily be penetrated. This is due to major players such as Siemens, Toyota Industries, Kion Group and Tompkins Robotics. Secondly, consumers in the market have specific requirements that make the cost of changing intralogistics systems higher, strengthening the customer loyalty. Imeguisa would have to significantly outperform its competitors, for consumers to switch providers, as it is not expected for the major players to exit the market. Additionally, Imeguisa only offers its solutions in limited industries, indicating exceptionally high vulnerability associated with the automotive industry. Lastly, the high and long-lasting inflation generated by the Ukraine War will significantly impact the overall cost structure, notably in the raw materials, and ultimately, spading the firm's profit. Inflation is expected to diminish slightly in 2023 and 2024 with an estimated inflation rate of 6,5% and 4,1%. (International Monetary Fund

2022). Consequently, governments and central banks around the globe will adjust their fiscal and monetary policies, generating an uncertain economic environment.

5.4.2 FSA-CSA Matrix and Porter's Generic

The FSA/CSA Matrix is made of two main blocks. The first block is the Firm-Specific Advantages (FSA), referring to firm-level characteristics that offer a competitive advantage to the company. The second block is the Country Specific Advantages (CSA), which are unique to each country (Rugman 1981).

Imeguisa has a strong FSA. They vary from a superior quality customer experience to a strong innovation focus with the application of sophisticated technologies, to a profound knowledge of the automotive sector, and access to a diverse pool of skillsets and know-how. On the other hand, the CSA is medium. Portugal offers a competitive working environment with a push in digital transformation and environmental friendliness. Those two factors put Imeguisa on the bottom right of the matrix with strong FSAs and weak CSAs (appx 27), meaning that during the internationalisation process the company needs to focus on exploiting its own resources.

There are three basic business strategies where companies perform best, when choosing one of them. Considering the previous analysis, Porter's forces and the FSA/CSA matrix, the best choice for Imeguisa Portugal is to follow a differentiation strategy instead of cost leadership and focus (Porter 1985). A successful differentiation strategy is defined by a value proposition that is unique and superior in quality (Allen and Helms 2006). Accordingly, the ongoing differentiation strategy espoused by Imeguisa, grounded on its portfolio's high degree of customisability, should be maintained for its international expansion. Moreover, Imeguisa's customer base, high-profile companies in the automotive sector, are considered to be an ideal target as they are relatively sophisticated and are willing to pay a higher price for unique or qualitative products (Allen and Helms 2006).

5.4.3 Motives for internationalisation

Internationalisation can be part of a company's agenda due to one of these four general motives: natural resource seeking, market seeking, efficiency seeking, and, lastly, strategic asset or capability seeking (Dunning 2008). In addition, there are factors that are pushing the country to internationalise abroad due to an adverse dynamic in the home market and pull factors that create attractive opportunities for the company abroad.

Based on an intensive analysis of Imeguisa's current strategy and positioning, and detailed industry analysis, one can conclude that the main driver of internationalisation seems to be market seeking. In addition, Marta Filipe states: "At the moment our challenge is to look for new sectors that can be satisfied by all our products, as long as they are adapted to new realities. Highlight: Retail and food sector." Imeguisa is currently experiencing a 2% growth, which is slower than the overall intralogistics market that has experienced growth at a CAGR of 14.3% from 2017 to 2021 (Fact.MR 2022). For Imeguisa to match the industry's growth, internationalising could be an option. The slow growth in Portugal is pushing Imeguisa to internationalise, with attractive opportunities pulling them towards that same conclusion.

Another pull factor is risk diversification. By expanding the company's international scope, the company will not be solely reliant on the Portuguese market conditions and its automotive sector. If a country's automotive industry is failing, Imeguisa will have the other markets as a safety net. On top of diversifying in terms of countries, Imeguisa is also looking into tapping into new industries, strengthening their ability to cope with the local economic and industry-specific fluctuations. In addition, by going abroad, the knowledge and experience gained can be translated into new resources and capabilities, owing mainly to the establishment of key partnerships. For an innovative company, such as Imeguisa, constantly thriving on innovation and improving operational capabilities is of utmost importance.

5.4.4 Global readiness

The company's readiness to export is assessed by analysing six dimensions which are key

for internationalisation (Zou, Kim, and Cavusgil 2009). Starting with Imeguisa's competitiveness in their domestic market, one can state that the company holds a **stable position** in the Portuguese market. Secondly, the company has multiple **strong motives** for going abroad. The company's first motive is to increase its sales and profit by targeting a larger pool of potential customers. The second motive is to increase its organisational knowledge and capabilities. The last is to increase its resilience.

Thirdly, the company is **moderately motivated** to internationalise. Imeguisa hired external consultants to perform an expansion project which shows motivation within the organisation. Regarding the internationalisation process, Imeguisa has little exporting experience as it has only exported the I-Frame to Argentina, Brazil, and Mexico in a reactive manner. Although the company does not have a knowledge of other markets in-house, by acquiring some extra expertise and some in-house, the **organisational readiness of Imeguisa can be substantially improved**. Almost all businesses are looking for efficiency and speed. At times expectations may vary depending on cultural differences, albeit the product adjustments will not be an issue due to the standard product customisation and the company's flexibility. For those reasons, **the enterprise's product is ready to go international**. Concerning its financial situation, Imeguisa is not in a favourable position to ensure a viable internationalisation strategy with high resource commitment, due to its high vulnerability to external and internal factors (as explained in **5.1.5**). Therefore, **the company is not ready for a capital-intensive operation**.

6 International market selection - Phase 1

After analysing the company's situation, a four-stage country selection process was carried out, comprising a country selection criterion, country clustering, country ranking, and a synthesis thereof. The purpose is to select five international markets with the greatest total potential for Imeguisa. In the preliminary phase of the process, various variables deemed relevant to the penetration of a foreign market were gathered, and their respective data was

collected. During the process, the number of countries is narrowed down.

6.1 Country selection criteria

The original dataset was composed of **198 countries,** with data collected from different global sources such as the World Bank, The Global Economic Forum, the Observatory of Economic Complexity (OEC), and others.

Categories relevant to identifying markets with high potential for international expansion were chosen and measured using **30 final variables** tailored to the intralogistics industry (appx 28). They include market-related factors (i.e. how beneficial it is to go there), infrastructure-related factors (i.e. how easy it is to operate there), country-related and business risk factors (i.e. how risky it is to perform there), technology-related factors (how technologically advanced is the market?), environment-related factors (how committed is the country to the adoption of environment-friendly measures and practices?) and, finally, culture-related distances (Schein 1992). The information collected consists of the most recent data available and was used to reduce the number of countries, taking into account their market potential. The indicator "Ease of Doing" business is a proxy of the regulatory framework that firms looking to enter a foreign market must contend with in a given country. Strong parallels between requirements and laws directly affect business operations and define whether a business will succeed in a new market (Doing Business 2022). However, not all ten factors were relevant for the sake of the Imeguisa internationalisation, only half - *Getting Credit, Protecting Minority Investors, Paying Taxes Trading Across Borders, Enforcing contracts,* and *Resolving Insolvency*.

Firstly, the number of countries was reduced based on the **data availability** considering all variables, which led to a reduction of the original number to **154 countries**. The countries with more than 25% (8 input values) missing input values across the variables, were excluded. This criterion was employed to ensure the accuracy of the later in-depth analysis, as the high number of missing values for several countries could generate misleading outcomes.

The parameter – **Frontier Technology Readiness index**– was considered the second criterion of the country selection process. In fact, countries scoring less than 0,30 were not considered, which drove to the elimination of **55 countries**. This index evaluates the national abilities to equitably use, adopt and adapt 11 technologies (appx 28) and encompasses five building points: ICT deployment, skills, R&D activity, industry activity and access to finance. A low score in this index is associated with low-income and lower-middle-income countries with lower technological and innovation capabilities, slow absorption of modern technologies at the industry level and stringent intellectual property protection. All these characteristics are a key pitfall for the company's next move.

6.1.1 Approach and Methodology

Before starting with the country clustering and country ranking, the data was organised, cleaned, enhanced so that it could be accessed, interpreted, and used accurately.

To deal with the existing missing values, a Little's MCAR (Missing Completely at Random) test was performed using SPSS. The null hypothesis states that the missing data is completely at random, while hypothesis one states that the missing data is not random. With **a p-value of 0.181**, we failed to reject the null hypothesis, which means that statistical evidence shows the missing data is completely random with an 80 % confidence level. The strategy for dealing with missing values was the **multiple imputation by Chained equations (MICE)**, based on Fully Conditional Specification, as it can handle continuous normal, binary, ordinal, nominal, Poisson, and negative binomial-distributed variables. In the MICE method, a chain of regression equations is used on a variable-by-variable basis by a set of conditional densities, one for each incomplete variable (van Buuren and Groothuis-Oudshoorn 2011). In this case, using a machine learning imputer from *fancyimpute* package called *IterativeImputer,* with the aim of maintaining a high level of accuracy, was decided.

From the complete dataset, it was required to eliminate a selected number of variables due to

the high correlation between independent variables. The multicollinearity occurrence can lead to unrealistic and untenable interpretations, resulting from the very unstable p-values for assessing the statistical significance of predictors (Mason et al. 1991). A **Pearson correlation analysis** of all variables was conducted using *corr()* method from Numpy (appx 29). In the scope of the analysis, **0.90** was selected as the threshold to detect the variables with a relatively high correlation. As a result, 8 variables were excluded (*GDP, Industry Value Added, Trade (% of GDP), Global Innovation Index, Imports of Forks-Lifts (%Total Imports), Imports of Transport Equipment (%Total Imports), Imports of Industrial Robots (%Total Imports), Imports of Lifting and Handling equipment (%Total Imports*)). Further, to assess the receptivity of the intralogistics market, one variable was formulated, *Imports of intralogistics products (% Imports),* by summing the total value of imports of forklifts, transport equipment, industrial robots, lifting and handling equipment, and dividing it by the total imports of each country.

6.2 Country Clustering

Countries are grouped into clusters with similar characteristics based on various predefined variables. The variables in their entirety represent a country in terms of its economy, politics, risk, or cultural conditions, among others. Thus, one can see particularly well which countries have similarities, and which countries are probably less comparable (Cavusgil, Kiyak, and Yeniyurt 2004). It is therefore particularly easy to deduce whether a strategy for market entry or marketing in one country is also suitable in another with same cluster membership. Whereas country clustering does not provide any information on market attractiveness, country ranking does not give an answer to differences and similarities between countries, which in turn suggests that both methods should be evaluated in combination.

6.2.1 Approach and Methodology

The K-means method is a universally used clustering technique that aims to minimise the average squared distance between points in the same cluster. Although K-means is fast and

simple, it does not ensure accuracy. Therefore, we decided to use K-means++, which extends the k-means algorithm by selecting the initial cluster centre according to the D^2 metric rather than randomly from the data. Overall, this method results in a much more powerful algorithm that improves both the speed and accuracy of K-means (Arthur and Vassilvitskii 2007).

The K-Means ++ cluster analysis was applied to the final **99 countries**, employing **8** variables according to their relative weighting and heterogeneity matters to incorporate key categories.

Market Size	Market Growth	Technology Readiness	Infrastructure	Operating Costs	Country-Risk	Cultural Distance
Manufacturing Value Added	5-year CAGR Manufacturing	Frontier Technological Readiness	Logistic Performance Index	Petrol Prices Cost to export	Political Risk	Cultural Distance to Portugal

Table 5 - Variables used in Clustering Analysis

The first step is transforming all the features into a standardised format (Z-score) for a better outcome, using *sklearn.preprocessing.StandardScaler* class. The second step is to identify the optimal number of clusters. For that purpose, two techniques were used: Silhouette (Kaufman and Rousseeuw 1990) and Davies Bouldin index. According to Das (2021), the largest average silhouette width corresponds to the most optimised number of clusters, which in our case is 12. This outcome is corroborated by the Davies Boulding method as the 12 clusters have the lowest score highlighted in appx 30 (Wei 2020). The last step is to conduct the cluster analysis using class *sklearn.cluster.KMeans* with K-means ++ as the initiation method and Lloyd algorithm because it accelerate convergence, and is theoretically proven to be O(log k)-optimal (Arthur and Vassilvitskii 2007).

The insights from the key stakeholders and their restrictions were incorporated into the decision-making process. As a result, the analysis will filter out the clusters that follow at least one of these criteria: (1) very high market size, (2) shallow market growth, (3) very high technology readiness, (4) very high operating costs, (5) very high-country risk, and (6) very high cultural distance to Portugal.

6.2.2 Results and Limitations

The results suggested twelve similar groups of countries with the following table summarising the key findings. More information regarding the centroid value and the countries' membership of each cluster can be found in appx 31 and 32, respectively.

Cluster Id	Characteristics							Nº Countries
	Market Size	Market Growth	Technology Readiness	Infrastructure	Operating Costs	Country-Risk	Cultural Distance	
1	Medium	High	High	High	Medium	Low	Low	14
2	-	-	-	-	-	High	-	8
3	Low	Medium	Medium	Medium	Low	Low	Low	13
4	-	Very High	-	-	-	High	-	13
5	High	High	Very High	High	Low	Low	Very High	2
6	-	-	-	-	Very High	-	-	7
7	-	-	-	-	-	High	-	11
8	High	High	Very High	High	High	Very Low	Low	16
9	-	-	-	-	Very High	-	Very High	1
10	-	Very Low	-	-	-	-	-	1
11	-	-	-	-	-	Very High	-	9
12	-	Very Low	-	-	Very High	-	-	4

Table 6 – Country Clustering: Summary of Results - Non-defining Excluding Features

Clusters 5 and 8 were excluded due to the scale and hyper-adaptability of the countries belonging to the cluster, making it impossible for Imeguisa to hold a competitive advantage over the highly innovative national and international players and, ultimately, sustain a successful international strategy. On the other hand, cluster 10, characterised by countries with low market prospects and potential, was disregarded. Countries with high operating costs across borders were not considered further (Cluster 6,9,12) due to the company's financial constraints and the likelihood of generating low margins. Finally, to survive or unlock growth, operating in a country with political stability and similarities with Portuguese culture is critical for Imeguisa to establish vital partnerships with foreign countries, leaving aside clusters 2,4,7,11. Moreover, the role of regions in clusters is reasonably evident, albeit with some oddities.

Therefore, results demonstrated that only clusters 1 and 3 are particularly noteworthy for Imeguisa. Cluster 1 is dominated mainly by promising European countries with attractive manufacturing size and growth while ensuring cultural proximity and low operating expenses.

In addition, the membership of Portugal in this cluster enables Imeguisa to consider similar strategies for this country group. On the other hand, cluster 3 is characterised by emerging

countries from South America and Asia, with reasonable costs to exports and manufacturing growth rate and low petrol prices, but relatively distant in terms of cultural distance to Portugal.

Nevertheless, the limitations to the approach ought to be recognised: portfolio specification is ignored in the indicators; homogeneity within countries, disregard of big differences (Cavusgil, Kiyak, and Yeniyurt 2004); data is not conclusively available, originate from diverse sources and are not up to date; consider as a mutually exclusive cluster, instead of a sequence of another (Luqmani et al. 1994).

6.3 Country ranking

The country ranking approach ranks countries according to their market attractiveness in descending order. The higher a country is ranked, the more attractive it is for potential market entry. Cavusgil, Kiyak, and Yeniyurt (2004) list seven dimensions or categories according to which countries are evaluated where, ultimately, the overall market potential is calculated. However, these categories and variables should be adapted to the specific characteristics of companies and industries. In that case, one receives a pure ranking. All results require a more detailed examination in a subsequent step. Additionally, the problem described in chapter **6.2.2** arises, which is why using both methods, namely country clustering and country ranking, is highly recommended.

6.3.1 Approach and methodology

To rank potential markets or countries according to their market potential as precisely and meaningfully as possible, the variables must be carefully selected and thoroughly prepared. Errors or inaccuracies in this step produce a distorted result and can lead to potentially promising markets being overlooked. Since the variables are measured in different units and their absolute magnitude can vary greatly, it is necessary to standardise them first. The resulting standardised data follows a uniform scale, eliminating scale effects and preventing erroneous over or underweighting. In the next step, the variables are grouped into categories, weighted

(appx 33) to evaluate the countries, and subsequently calculated the final country ranking (appx 34). Assuming that a category or variable is highly significant in market attractiveness, it will also be given a higher weighting in the ranking process. Manufacturing Value Added as a measure for the market size is weighted with 14% since Imeguisa market seeking motive yearns for a large market size. Market intensity (7%) is also critical to consider existing market conditions. However, not only does the current market size that matter but also its development, characterised by the Market Growth category, which accounts for 10%. Market Receptivity measured by Import of Goods and Services (% of GDP), Cost to Import (border compliance), Total Imports of Lifting/Handling/Machinery, and Imports of Lifting/Handling/Machinery (% of total imports), was valued at 11% as the market openness to Imeguisa's products is essential. Technological Readiness is weighted at 6% and describes the ability of a country to use frontier technologies or to accept and adapt them. Although many of Imeguisa's products are highly technological, it seems important that target markets are not too technologically advanced. High technologically advanced countries are distinguished by higher competition and larger markets that Imeguisa does not have the resources to compete in successfully. Furthermore, the infrastructure to deliver the physical products of a country is essential. Therefore, the Infrastructure category was included, with a weight of 13%. Operating Costs are weighted at 12%, being one of the most important factors because transport and travel associated costs are high in internationalising.

To consider uncertainties and risks associated with internationalisation into account, Country Risk accounted for 10% of the weight. Furthermore, Doing Business was included and rated at 7%. Meaningful variables were picked from the World Bank's Ease of Doing Business index and combined into our Doing Business category (World Bank 2022a). Environmental Governance is also included at 3.5%, under the assumption that developed industrialised countries that are more conscious of resources and the environment are more receptive to

Imeguisa's products that bring efficiency to production processes. Finally, cultural distance to Portugal (Hofstede Insights, 2022) was evaluated at 6.5%, as the after-sales service is a vital component, making similarities in the target country very favourable.

6.3.2 Results and Limitations

The approach yielded a geographically well-balanced list of countries (see the Top-15 in appx 35 for a conclusive list). Most high-ranked European countries are Germany, Ireland, and Switzerland, ranked 4th, 7th, and 8th, respectively. There are nine European countries in the Top-15, and five in the Top-10, although only one is in the Top-5. The US ranked first and is the only American country in the Top-15, as Canada ranked 19th. With China (2nd rank), Singapore (3rd rank), Japan (5th rank), and South Korea (6th rank), there are four Asian countries in the Top 5, and five in the Top-10, having Hong Kong ranked 15th. For the next phase, we decided to analyse, five countries for clusters 1 and 3, as these clusters are most suitable for Imeguisa's reality. The highest-ranked countries in the first cluster are the Czech Republic (18th), Spain (20th), Poland (21st), Estonia (27th) and Slovenia (28th), closely followed by Portugal (30th). The highest ranked in cluster 3 are Malaysia (17th), Thailand (31st), India (35th) and Malta (38th).

The same limitations arise as with country clustering (see 6.2.2). One further limitation is the neglect of indicators specific to the object of internationalisation (O'Farrell & Wood 1994). Furthermore, variables selection is a qualitative decision that may be subject to the subjective views of the decision-makers. Additionally, there is little insight into how this method works in the FDI context, but it is mainly applied and researched in the export context (Papadopoulos and Martin 2011). Finally, the results obtained have limited validity due to rapid changes in a dynamic business environment (Gaston-Breton and Martín 2011).

6.4 Selection of highest potential markets

In the final phase, country ranking, and clustering were combined by examining 10 high-potential countries in two different clusters (1 and 3) with three major factors that need to be

satisfied: (1) potential of retail and automotive end-user markets (appx 36) (2) a favourable competition landscape (appx 37), and (3) low geographical distance to Portugal (appx 38). Firstly, the automobile and retail industry, which Imeguisa is especially interested, currently has a high degree of automation application. On the other hand, a small number of competitors can increase Imeguisa's profit potential, making that market more attractive. The existing Imeguisa' rivals were obtained as proxy of the number of players operating in different sectors (storage and handling; intelligent transport systems; material handling equipment industry sectors) (Marketline, 2022). In turn, in countries located closer to Portugal, it is more likely that the internationalisation plan will prove successful due to the lower freight costs. It is, therefore, straightforward to deduce that Imeguisa would have a lower probability of suffering a significant impact in its operating margins. In addition, United Arab Emirates, Malta, and Indonesia were disregarded due to the lack of information available. The table below encapsulates the key findings, aggregated by the criterion's preference level in a given country.

Level of preference L  H

Countries	Slovenia	Estonia	Poland	Czechia	Lithuania	India	Thailand	Malaysia	Mexico	Turkey
Rank	25	27	21	18	33	35	31	17	41	47
End-User Potencial[1]										
Competition										
Geogrpahic Distance										

Table **7** - Summary of Top 5 Country Selection

Although India has a remarkably high end-user potential, it is not included in the in-depth analysis due to high competition and relatively high geographical and cultural distance to Portugal. Thailand and Malaysia also fail to leap into the in-depth analysis; although its market potential is high, and the competition landscape is acceptable, Imeguisa would face high costs in terms of shipping due to the very high geographical distance. Turkey and Mexico have

outstanding market potential and a very promising competitive landscape and are therefore considered further despite the distance that is still more favourable than the previous countries. Poland and Czechia have relatively high end-user potential and the competitive situation is also promising. Since they are relatively close, in terms of geographical distance, these two countries are also examined in detail. Even though there is low competition, the existing potential in Estonia is too low to be considered further. The decision on whether to use Slovenia or Lithuania for a more detailed analysis was very close. Both have manageable potential with a satisfactory competitive situation, but Lithuania is behind in the country ranking, so Slovenia was favoured in detriment of Lithuania. In sum, the top five countries which will be examined in an in-depth analysis are: Slovenia, Poland, Czech Republic, Turkey, and Mexico.

7 International market selection – Phase 2

7.1 In-depth market analysis of Czechia

At first glance, Czechia appears to be particularly beneficial for the intralogistics market due to the nation's century-long engineering tradition, excellent industrial quality and reliability, strategic location in Central Europe, and first-rate transportation infrastructure (CzechInvest 2018). The Czech economy is characterised by high participation in global value chains (GVC) and elevated levels of export sophistication (72.6% of GDP in 2021) (World Bank 2022b). This nation boasts one of the greatest industrial production ratio as a fraction of GDP juxtaposed with other EU nations (31.21%) (O'Neill 2022). Moreover, one of the most extensive worldwide concentrations of automotive-related manufacturing, design activity and industrial robot installations can be found there. Nonetheless, stronger and longer-lasting price surges (especially in oil, electricity, and natural gas problems), disruption of supply chains, and tight financial conditions are expected to strike a colossal stagflation effect in the Czech economy, with inflation surpassing 15% this year and remain elevated in 2023 resulting in a low GPD growth (% YoY) of 0,1% (OECD 2022b). In parallel, the government seeks to endorse labour

supply (improve digital skills) and accelerate the green transition (reduce reliance on the gas and oil markets) (OECD 2022b). Despite the unfavourable period, half of Czech manufacturing firms (49%) plan to invest 15% more in smart technologies (e.g., robots and big data) in 2023 offering excellent business opportunities for Imeguisa (Czech Technical University 2022).

7.1.1 Contacts

A vital component of international expansion success is establishing or leveraging relationships. All contact information is available in appx 39. Company's existing relationships including **current customers** – vehicle manufacturers (e.g., P.S.A. Peugeot Citroen, Mercedes Benz, and Fuso) or vehicle part manufacturers (e.g., Eberspaecher, Simoldes Group and Continental) – operating in Czechia can be leveraged into partnerships; if they allow Imeguisa to begin serving their needs in the target market. As the foundation of Imeguisa relies on close customer proximity, it is crucial to have **distributors or agents** in the field that can market the product to significant corporations and ensure a high-quality service, whether sales, after-sales technical support or training. DREAMLand, AM Tech Robotics, Zlinrobotics or S.D.A. (Sensors. Drives. Automation) are highly recommended as they are the major local distributors or integrators of autonomous robots (Companies' website 2022). Consequently, Imeguisa can leverage their rich expertise, broader reach, and extensive portfolio of associated services (training, support, maintenance/repair) that facilitate the delivery of high-performing and flexible automation. In turn, Auto Sas can be a valuable local contact as the company specialises in material handling equipment, offering services from consulting to maintenance, including the sales. For instance, companies that provide end-to-end supply chain services in the Czech Republic, such as Impulse 4.0, are valuable partners as they work with Fortune 500 manufacturers and constantly seek innovative synergies.

Regarding **government agencies**, establishing contact with the CzechTrade, the state trade promotion agency, is essential as it offers a broad set of business support and networking

services, namely, introduction to Czech quality suppliers and organisation of buyer's visits. In addition, it provides valuable information about doing business in the Czech Republic. Besides, the collaboration with CzechInvest, the government business development agency, is also recommended as it supports fresh players in the manufacturing industry and can be the main point of contact for state incentives, commonly in the form of tax relief and subsidies. As the most prominent representative body of businesspeople, the Czech Chamber of Commerce would be the third pivotal contact as their main task is the development of trade. Lastly, for further support in insurance against commercial and political risks associated with export and investment, Imeguisa can reach out to the COSEC, the Portuguese Export Credit Agency. In terms of **associations**, Czech Logistics Association offers scientifically founded advice, access to the national network (government, universities, leading companies in automotive, logistic and transport sectors, scientific organisations), and involvement in market development projects. Similarly, the Czech Republic's Association of Forwarding and Logistics is influential in networking and lobbying. In turn, the Confederation of Industry of the Czech Republic and Automotive Industry Association would allow Imeguisa to benefit not only from a great network of potential clients – the vital Czech players in the car manufacturing industry but also in other industries like retail – but also the from the access to critical technical, production, commercial and statistical information. In respect to **financial institutions**, the Czech National Bank is highly recommendable as the country's primary bank and financial market supervisor, providing licensing and approval proceedings, on-site and off-site supervision and international cooperation (BTI 2022a). In addition, as a leading corporate lender and the largest EUR/CZK trader in the Czech Republic, Česká Spořitelna seems to be a reliable and advantageous bank for supporting SME businesses and facilitating financial transactions.

Lastly, the presence in well-known **fairs and events** such as MSV International Engineering Fair and PVA Expo Prague is critical as they bring greater visibility for Imeguisa in early stages.

7.1.2 Competition

A similar methodology as in chapter **5.3.4** was applied, i.e., the 5-parameter clustering approach to assess the competitive landscape in the Czech Republic. Slight adjustments to the nature of variables and the inclusion of other factors were made to accurately evaluate Imeguisa's market positioning. For instance, the replacement of 19 "industry served" variables by a new categorical variable - "industry range"-, the inclusion "customisation-oriented" to gauge the adaptability to the end-user needs and, lastly, "product range" as a measurement of the variety of solutions provided.

All categorical variables were converted into numerical variables using a hot coding technique for "customisation" and a label coding technique from 1 (low) to 5 (high) for "industry range" and "product range". The dataset was compiled from 13 companies (including Imeguisa) with data from Orbis and the companies' websites (only post-2020 data was considered) **(**appx 40). The results suggest four main types of competitors (by Silhouette method, appx 41), with the main findings summarised in the table below. More details about the cluster membership in appx 42 and the centroid's values in appx 43.

Cluster ID	Characteristics							Nº of Companies
	Financial Performance	Size	Product Affinity	Industries Range	Global Presence	Product Range	Customisation -Oriented	
1	High	Large	Medium-High	High (10)	High (60)	High	Low	6
2	The Strongest	The Largest	High	High (>11)	High (89)	High	Medium	1
3	Weak	Small	High	Low (4) Non- serving automobile	Low (2)	Low	High	3
4	Medium	Medium-sized	Low	Medium (6)	Medium (20)	Medium	Low	4

Table 8 – Czech Competitive Landscape

According to the results, the Czech Republic is characterised by a fragmented and highly competitive intralogistics market dominated by the subsidiaries of global groups such as Jungheirich, Kuka Automation, Kion Supply Chain Solutions, Staeubli Systems, Toyota Material Handing and Korber Supply Chain (belonging to cluster 1) and the front-runner ABB (belonging to cluster 2). The former companies offer a more comprehensive product range that

caters to a varied customer's needs. Given the substantial financial resources and geographically broad positioning, clusters 1 and 2 are considered the most significant rivals of Imeguisa and, therefore, must be examined more closely. Imeguisa's closest peers are in cluster 3, Kivnon Global SL and ServisControl, small companies that specialise in niche markets providing modifications and customer-specific orders. Hence, they should also be carefully monitored due high product affinity. In turn, cluster 4 companies, SSI. Chaefer, Beewatec, and the locals Kvados A.S and U & SLUNO A.S do not pose a considerable threat to Imeguisa due to distinguish product breadth and non-serving of the automotive industry. In conclusion, despite Imagism's lack of financial and networking advantages over major rivals, Imeguisa offers a compelling portfolio for the automotive industry and top-notch after-sales support that might outperform smaller rivals. Nevertheless, two limitations must be acknowledged, such as the limited number of competitors due to the unavailability of up-to-date information (e.g., Comau Czech and Zetes Solutions) and not the inclusion of foreign companies that indirectly sell to the Czechia (e.g., Agilox Systems GMBH, Milvus Robotics, Locus Robotics Inc, and others).

7.1.3 Overall market sales potential and company sales potential

Considering only the segment that Imeguisa intends to internationalise, the intralogistics market was narrowed down to lifting and handling equipment segment, as the relevant products are automated guided vehicles (AGV) and autonomous mobile robots (AMR). A combination of the cross-sectional analogy and chain ratio method was used to assess the individual and, ultimately, Czechia's overall market sales potential for the next five years. Spain was used as a benchmark for the analogy due to the equivalence in market attractivity, infrastructure, business, and country risk, i.e., the same cluster membership as Czechia.

The CAGR of 2016-2021 for the handling equipment market size for Spain and Czechia (5% and 6,2%, respectively) was projected to be extended to 2022, as one can assume the impact of Covid-19 would be offset by the market's fast recovery (Passport 2021). By analogy, the total

Czech potential sales for AMR segment is **US$14,64m**, while for AGVs, it will be **US $25,68m** in 2022 (appx 44 and 45, respectively). More information about the assumptions displayed in appx 46. As the nation reveals sturdy growth prospects for advanced manufacturing, it will be assumed that the CAGR for both products in Czechia would not significantly deviate from the European values (European Commission 2022d; BTI 2022a), resulting in a CAGR of 23,82% for AMR and 18,9% for AGV, during the forecasted period (Triton Market Research 2022; Mordor Intelligence 2022a). Given its predominance in the Czech market and high production growth rates compared to other European countries (CAGR 2021-2025 of 8,1%), the automotive segment's share in both markets was assumed to be 10% higher than in Europe (CzechInvest 2019; Passport Euromonitor 2022). Therefore, the automotive sector will be accounted for a steady market share of 30.9% (=28,1%×1,10) in the AMR segment and 21,68% (=19,9% × 1,10) in AGV (Statzon 2022e). The chain method resulted in a AMRs market sales potential of around US$4.53m and US$5.59m for the AVGs market. Thus, the total sales potential would be **US$10m** in 2022, reaching **US$26m** by 2027 with a remarkable overall CAGR of 21,12% (appx 47). By applying 20% of market penetration in the Portuguese automotive AGVs and AMRs market (=1,89%), Imeguisa's potential sales in the Czechia are **US$190k** in 2022 and **US$551k** by 2027 (appx 48). For simplicity, the same analogy was used to calculate the total Portuguese market potential (appx 49). The figures reveal a high degree of expansion unviability as operating costs could quickly threaten Imeguisa.

7.1.4 Market entry conditions

Czechia is a very business-friendly country, characterised by a free market with the highest (=100) score on ease of trading across borders in 2020 (World Bank 2019). **Trade barriers** for Imeguisa are low or non-existent as both Portugal and Czechia are EU members.

This nation has one of the most globally developed **transportation infrastructures** due to the density of its network of routes and distribution of airports, warehouses, and

telecommunications (CzechInvest 2018). In addition to well serving the country, the physical infrastructure also connects to other European nations like Germany, Poland, and Slovakia.

The weak **investment environment** outlined by the recent thigh monetary policies suggests that Imeguisa can encounter difficulties in financing. The SMEs commonly raise capital through credit lines (52%), bank loans (43%) and leasing (50%) (OECD 2022b). In turn, the country ranks 48th on the Getting Credit of Doing Business index owing to the strict rules for credit risk management, requested high loan collaterals, and fluctuations of interest rate spread (World Bank 2019). Full or partial prepayment, with the balance due upon delivery or net 30-day terms is a typical payment practice. Letters of credit (LC), documentary collections (D/C), and wire transfers are usually used as **payment methods**. The Czech crow can be simply converted to euro, without the trade suffering from the controls (ITA 2022).

International and domestic firms face equal tax structure (corporate income tax, including capital gains:19%) (Lloyds Bank Trade 2022). The social security fund captures 24.8% of the worker's gross wage while 9% moves to the health insurance fund. In addition, the company is liable for an extra 15% to 35 in environmental, and road taxes or for international services providers. No regional or local taxes on income are charged. A VAT is applied at 21% on exchange of goods and services. The government has supported the manufacturing sector by providing exemptions (CIT relief for ten years) and subsidies for job creation with a maximum of CZK 200,000 and training covering 70% of the expenses (Accace 2022).

Nevertheless, **starting a business** requires a considerable investment of time (27.5 days) and resources (1.1% of GNI per capita in 2019) compared to the OECD high-income countries (BTI 2022a; World Bank 2020). **Documents** needed will encompass at least the Affidavit from the executive director, and a Commercial Register extract (Business Setup 2022). Although Czechia integrates the World Intellectual Property Organisation, the body liable for protecting intellectual property is Ùrad Prùmyslového Vlastnictvi, covering improvement proposals,

designations of origin and geographical product labels (UPV website 2022). This nation has harmonised its standards with the EU, including the legislation for data protection (controlled by Office for Personal Data Protection (UOOU website 2022). As part of Integrated Pollution Prevention, environmental projects must only be carried out when an environmental impact analysis has been completed, and the necessary permits have been obtained.

Finally, Czech society is still largely male-dominated, with a large share of older businesspeople who might hesitate to speak English; therefore, an interpreter is advisable. The **business culture** is associated with a strict hierarchy, formality, and indirect communication, leading to slow negotiations, and posing as a potential challenge for Imeguisa (Conbiz 2022).

Although the Czech entry conditions and the market attractiveness may favour the expansion strategy, the current political, economic and investment environment has raised a red flag.

7.2 Selection of the target market

	Market Sales Potential 30%	Competition 30%	Entry Conditions 20%	Contacts 20%	Weighted Average
Slovenia	1	4	4,5	4	**3,2**
Poland	3	2	4,5	3	**3**
Czechia	2	2	3,5	4	**2,7**
Turkey	5	2	3,5	4	**3,6**
Mexico	4	3	3,5	4,5	**3,7**

Table 9 - Ranking of countries analysed in-depth

As shown by the above table, weights were assigned to the dimensions studied in the in-depth market analyses, according to their perceived importance. Each country was ranked on a scale from 1 (not favourable) to 5 (very favourable) on each one. The highest potential market for Imeguisa was then determined on the basis of the weighted average approach. Frontrunner Mexico was thus selected as the target market. Further supporting this decision was Imeguisa's clear preference for Mexico, the only market among the 5 previously served by the firm in an exportation reactive manner.

8 International entry strategy

After defining the most promising country in the previous phase, the next step is to perceive the optimal entry strategy. The type of entry strategy has implications for the characteristics associated with internationalisation such as risk, cost, flexibility and control. While internalisation entry strategies entail more risk and higher costs with high control and little flexibility, externalisation entry strategies are cheaper, less risky and more flexible, but offer little control over the business taking place in the target market. The choice of entry strategy is influenced by several factors grouped into four categories. These are internal and external factors, transaction specific factors and desired mode characteristics. Finally, the analysed factors are compared with the available entry modes and the most suitable strategy for the market entry of Imeguisa in Mexico is determined.

8.1 Selection criteria

According to Sanchez-Peinado, Pla-Barber and Hébert (2007), one could argue that the narrow-perceived gap between Portugal and Mexico in terms of culture and business practices provides a significant opportunity for an entry mode with heavy resource commitment. Mexico's robust industrial activity, especially in the automotive sector, generates significant demand for intralogistics solutions, namely AGVs and AMRs. However, the interference of non-democratic actors, such as drug cartels and criminal groups, in the political and business environments (BTI 2022b), as well as the tense relationship between Mexico and its largest trading partner, the United States, could hamper growth, providing an incentive for relatively medium-resource and commitment entry modes. In addition, customs procedures facilitated by the EU-Mexico Free Trade Agreement currently in force, blended with potentially enhanced IPR protection, would encourage FDI (PWC 2022a). On the other hand, internationalisation could be hampered by the difficult access to financing experienced by SMEs in the country, as well as the predicted relatively high competition, as less lucrative markets require less significant resource input. Given the abundance of relevant intermediaries, there is room for

opportunistic behaviour.

Imeguisa's relatively weak competitive strategy argues for a less resource-intensive entry mode to minimise unnecessary risks that can have far-reaching consequences for the comparatively small company. This argument is also supported by the little international experience Imeguisa has. Although Imeguisa has previously done business in some South American countries, via reactive exporting, these international efforts were already discontinued in 2014. In contrast, the high level of complexity associated with the technical nature of the products requires entry modes that go in the direction of internalisation.

In the same way as the product complexity, the tacit nature of know-how also leans on more resource commitment. In addition, a moderate level of opportunistic behaviour can be assumed on the part of the stakeholders involved. Imeguisa is risk-averse and prefers the greatest possible flexibility, at least to be able to put internationalisation efforts on hold if necessary or discontinue them altogether. The firm would also like to retain a certain degree of control but accepts less control to ensure safe action.

Both the internal factors and the desired mode characteristics speak very strongly for the choice of externalisation entry modes. While the external factors favour externalisation, the transaction specific factors suggest internalisation entry modes. All in all, the focus is on externalisation entry modes and the intermediate entry modes closer to externalisation or, more precisely on direct and indirect exporting, contract manufacturing and management contracting. See appx 50 for a visual presentation of the selection criteria.

8.2 Analysis of alternative entry modes

The first adequate entry strategy is **exporting.** This mode implies the company sells abroad a produced good in the home country, which offers a high amount of flexibility and capability to adapt. Furthermore, it is not necessary to invest in foreign production (Mariadoss 2017). Mexico has stable relations and good trade agreements with Portugal, suggesting a potential

export activity easiness (Mariadoss 2017). The most significant cost category with exporting are marketing and distribution expenses. While relatively low in risk, exporting can entail high costs of distribution and limited control.

Depending on the company's capabilities, experience in the new market, the physical distance and the time difference, the exporter might have to rely on third parties. The physical distance from Mexico can accentuate the drawbacks of exporting and will increase transportation costs. In addition, the company does not have the experience in the country to manage everything independently. The main control the company hands over during exporting is the marketing and distribution of its products (Mariadoss 2017). Exporting might make it more challenging for the company to customise and install high technological products and operate its aftersales services effectively. One of the main success factors of this operation will rely on the company effectiveness in transferring their aftersales services to a third party.

The disadvantages of exporting can be mitigated by choosing the right exporting style. On one hand, in **direct exporting** the company exports directly to buyers abroad and it is heavily involved with the operations, controlling many aspects of the exportation. (Neelankavil and Rai 2016). For instance, distribution, payment arrangements and bureaucracy procedures are commonly part of the exporters' duties. On the other hand, in **indirect exporting**, an intermediary is commonly responsible for most of the operations, such as closing the deals, shipment and payment collection, resulting in less autonomy for the exporter. Consequently, this mode provides a more effortless penetration of foreign markets, especially for inexperienced companies as Imeguisa. However, due to the existing interdependence, the success and operation risk is divided between the exporter and its partners (Neelankavil and Rai 2016). In this case, Imeguisa can leverage the partners' expertise to overcome knowledge gaps, find customers and reduce uncertainties and risks associated with operating in foreign markets (Terjesen et al. 2008). Although indirect exporting is easier to implement, requires

fewer resources and demands less management time, the potential gain of direct exporting is higher, at the cost of higher risk for the company. Nonetheless, during the past and reactive exportation activities, Imeguisa would only close deals with foreign clients on the condition that documentation and international shipment were taken care of by the client itself.

The second entry mode is **contract manufacturing,** in which company concludes an agreement with a third-party provider, to produce components, or products, during a specific period (Malsam 2022). Additionally, companies with fewer resources – in terms of time, money, and people - or null experience, like Imeguisa, would have the opportunity to collaborate with other companies to fill the former needs in terms of production. Imeguisa would be able not only to overcome the lack of space capacity and benefit from scalability opportunities, but also to allocate all its efforts into branding, marketing, and other important tasks. Parallelly, all training, equipment and materials costs are outsourced. Lastly, it is faster to reach the market since the contract manufacturers already have the know-how and the experience to produce more efficiently. Even so, some disadvantages need to be accounted for. Although quality contract manufacturing is a resourceful alternative, matching the company's requirements can portrait a challenge in many circumstances. Further, the company might jeopardise its intellectual property by losing control and the possibility of sharing mechanisms and knowledge (Malsam 2022). In Mexico, this entry mode would not be allowed, as the outsourcing of parts of Imeguisa's primary business activity is forbidden according to Mexican legislation (Martínez and Carvajal 2021). Even if it was allowed, Imeguisa would lose the know-how on product customisation – one of the sources of its competitive advantage –, as the third parties would incorporate Imeguisa's insights to deliver the best product.

Another alternative is **management contracting**. In this strategy, the work is shared by several suppliers, hired by the management contractor that the client chooses it. Imeguisa would benefit from specialist input that the management contractor brings into the company, by

entering the project at the early stages (Wessing 2019). Besides, it offers higher flexibility to start working on operations, even while the project design is being processed. Additionally, the management contractor eases the bureaucratic burden for the company. One disadvantage is that the management contractor is only responsible for its own obligations. Thus, the risk of work delivery is split between the contractors. Furthermore, the firm takes the risk of insolvency from the contractors. When compared with contract manufacturing, management contracting offers higher risk (Wessing 2019). In Mexico, Imeguisa and the other party must comply with extensive tax and social insurance regulations. In particular, the non-compliance with the Mexican regulatory laws could lead to fines and penalties (Bradford Jacobs 2022).

	Cost	Risk	Fit	Time invested
Direct Exporting	5	5	4	3
Indirect Exporting	4	4	4	4
Contract Manufacturing	4	3	2	3
Management contracting	3	2	2	2

Table 10 – Evaluation of entry mode strategies

In the above table, an evaluation of the adequate entry strategies is shown. The higher the number (maximum of 5), the more beneficial this category is for the company. For instance, a cost of 5 means that the cost of the entry strategy is low. Based on the results of the table, a mix of Direct and Indirect Exporting is decided as the entry strategy for Imeguisa.

8.3 Entry mode selection

Further detailed exploration of exporting, contract manufacturing and management contracting concluded that the best entry strategy for the company is a mix of direct and indirect exporting. The indirect export activities are preferable because the company sells a solution that requires considerable after-sales support (installation and maintenance) and training that must be handled by a distributor or agent who is well-positioned to provide such a service. Nonetheless, in the early stages, Imeguisa will establish direct contact with a customer (with whom Imeguisa has already an established relationship in Portugal), slowly easing into intentional export activity. Physical distance will not be relevant in this phase since the client

will hold all the distribution responsibilities. In the long run, some local partners or third-parties e-commerce platforms will be beneficial for acquiring new clients, hence increasing the market coverage in other regions. The company will then engage in more indirect export activities. Imeguisa will leverage the distribution channel with the newly acquired partners and take the distribution responsibility away from the client. Third-party export facilitators, such as e-commerce platforms, can remove much of the complexity and hazard.

Indirect exporting is the least risky export strategy, in line with the company's strategy. It enables Imeguisa to surround itself with strong partners, which will ease the company's workload as they will handle the location of potential buyers and ship the goods. The payment collection should always be done by Imeguisa to ensure that payments are done on time and to avoid fraudulent payment. The work that will be allocated to the partners is flexible and will be based on Imeguisa's needs and preferences. Certain aspects must be kept in mind for the operation to succeed. The physical distance between Portugal and Mexico increases the transportation costs and could further complicate the coordination between stakeholders. Furthermore, even if there are trade agreements between Mexico and Portugal, there are specific rules and regulations that Imeguisa needs to be aware of, explored in more detail in point **7.5**. For long-term success and to exploit the Mexican market's full potential, Imeguisa must gradually adapt its expansion strategy on the basis of market acceptance in Mexico. If the company is successful, it can follow the Uppsala model to gradually increase its commitment and presence in the target market. The Uppsala is based on gradual acquisition, integration, and use of knowledge in the targeted market (Johanson and Vahlne 1977).

9 Marketing plan (B2B)

9.1 Marketing objectives

For Imeguisa to succeed in the future, clear marketing objectives must be defined to guide its decision-making. The goals need to follow the S.M.A.R.T. methodology (Specific, Measurable,

Attainable, Realistic and Timely) (Doran 1981). In this industry, short-term objectives are determined for the coming year; mid-term objectives are up to 5 years, and long-term objectives are up to 10 years. The company's objectives will be divided into multiple categories for a comprehensible structure.

The first objective category is to **strengthen the company's financial position**. Imeguisa is not ready to internationalise as it does not have the financial capabilities to perform this capital-intensive operation. To reach this financial capacity and strengthen its position Imeguisa needs to increase its average order value to 150.000€ per customer. The current revenue growth of Imeguisa is 2% on average per year (Orbis 2021). Based on the overall growth of the AGV and AMR market, Imeguisa needs to target 7% growth in the short and medium term and an average growth rate of at least 3%, for the next 10 years. To internationalise, the firm shall grow faster.

The second objective is to **meet customers' needs**. Imeguisa needs to aim at a high level of customer satisfaction with a positive response rate of 90% in the annual questionnaire sent to its clients. Furthermore, a repeat purchase rate of 80% should be maintained for the company. The repeat purchase rate is the percentage of customers who do business with a company again after their first purchase (Atwell 2020).

The third objective is to **improve brand awareness**. The company should aim at increasing the traffic to its website by 50%. Currently, the company is using Google Ads to drive traffic to its website. Even so, more resources can be allocated to Google ads to increase the number of visitors to their website and improve the conversion rate of their campaigns. In addition to Google ads, resources can be devoted to LinkedIn to reach new clients.

The last objective is **market expansion**. With the aim to internationalise to Mexico, the company should strive for a 0,5% market share in its first year of penetration. In the medium-term, the market share should be increased to 2% for a successful penetration in Mexico. Longer-term objectives are too unpredictable and will be determined based on the acceptance

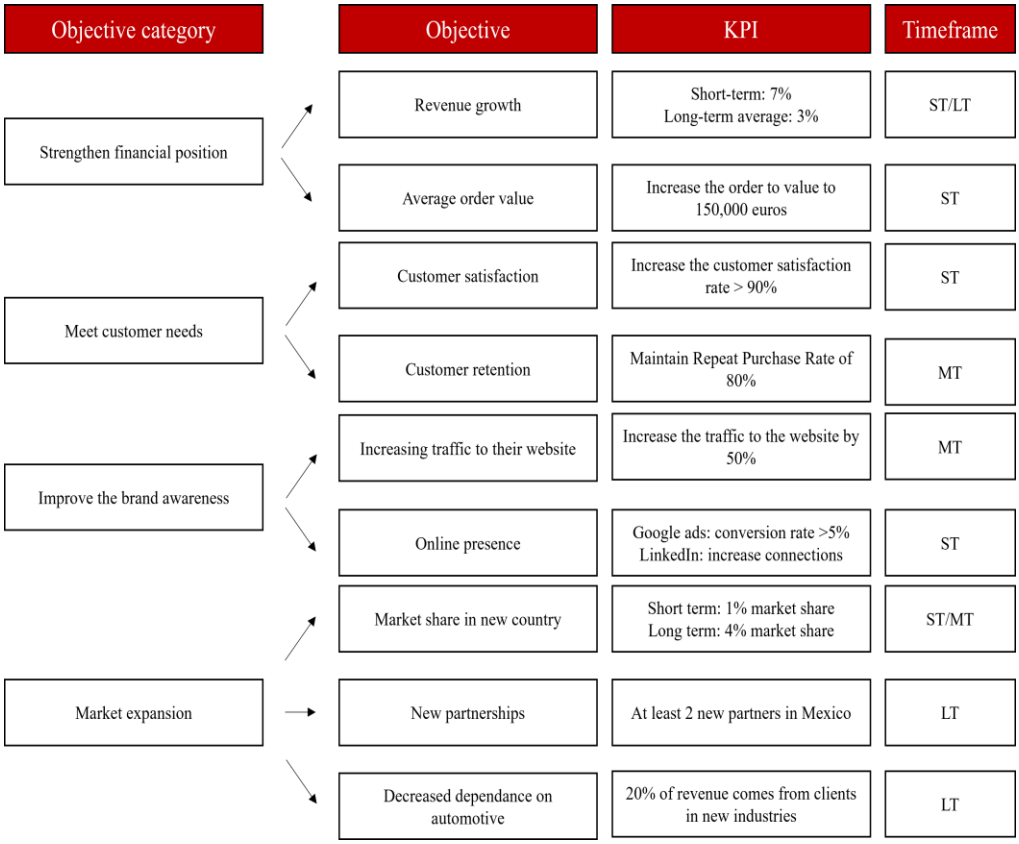


Figure 2 - Imeguisa's objectives and KPIs

of Imeguisa's products in Mexico. On top of market share in Mexico, the company should aim at establishing partnerships with at least two local companies. Those partners can be responsible for the installation, the maintenance, and repair. Since one of the company's motivations is to reach new industries to decrease the dependence on the automotive industry, 20% of the revenue should come from clients outside the automotive industry in the long term.

9.2 Segmentation & Targeting

For the sake of segmenting the AGV & AMR market in Mexico, the nested approach was employed, considered a "practical and comprehensive means for segmenting business markets" (Weinstein 2011). Nevertheless, this framework was slightly adjusted to include customer needs and preferences, as Imeguisa leverages from wide-ranging insights, and perceptions of purchasing behaviours. As a result, the approach focuses on two main criteria – firmographics, and a combination of purchasing factors. The former involves gauging the most favourable

industry, company size and potential customers' location. The latter consists of characteristics surrounding the decision-making process of buyers, which in our case included *order size, price sensitivity* (degree of willingness to pay a premium for certified services), *perceived likelihood of a long-term relationship* and the *needs prioritised by customers*, such as product quality, high levels of sales & technical service, ease of doing business with a supplier, timely and reliable delivery. Three profiles were defined as having similar purchasing characteristics as a basis; they were designated *price fighters*, *partnership-focused* and *premium fanatics*. In a situation where knowledge and specialist analysis are available, Imeguisa should consider all these factors in the market segmentation process.

The **price-fighter** segment takes a transactional approach without looking for "extras" in the product or service, as they have little relevance for its business. Such firms are generally small with low margins and demand lower degrees of specialisation in services and products supplied. Large firms' robust financial analysis departments can ensure that their companies are unusually price-oriented when making purchasing decisions. In addition, a buyer's attention to cost factors also depends on whether creditors can hold them accountable and how uncertain they are regarding a decision's outcome. As a result, some car manufacturers take a cautious approach to purchasing, comparing different suppliers and splitting their orders to diversify risk. Thus, the likelihood that they will rely on previous relationships is low.

A **partnership-focused** segment represents companies that place massive importance on trust and reliability with suppliers, considering them strategic partners. This segment emphasises the ease of doing business with the supplier and on-time and reliable delivery. Such companies are often large; therefore, the volume of each order tend to be large, and the somewhat medium price sensitivity reflects a good deal for both parties. Relationship duration is positively related to supplier selection probability (Badorf et al. 2019) and, ultimately, to the likelihood of making follow-on sales and upselling.

A **premium fanatic** seeks the absolute best product in the market and is willing to pay a premium price for it. These firms tend to place the product/service at the core of their positioning strategy. Hence, there are high requirements for product quality and range, but also for after-sales, maintenance, and support activities to match strict needs. This segment exhibits a high degree of loyalty if it is delighted by the product/service. Consequently, a long-term relationship can be built between the two parties under these conditions.

The table below summarises the selection criteria and the three profiles above-mentioned.

	Firmographics				
	Industry	Location	Status	No. Employees	Revenues (USD)
	Automotive	Northern Mexico	Independent	≤ 50	≤ $5,108,000
	Retail	Central Mexico	Subsidiary	≥ 51	≥ $5,108,001
	Food	Southern Mexico	Head of Corporate Group	≥ 251	≥ $12,770,001
	Purchasing Criteria				
Behavioral Profile	Order Size (units)	Budget	Long-term Relationship	Needs	
Price-fighter	small (1-3)	low (40K)	● ● ○ ○ ○	Low Price	
Partnership-focused	medium/big (≥ 4)	medium (100K ≤ *x* ≥ 40K)	● ● ● ● ●	Ease of doing business with supplier; On-time and reliable delivery	
Premium-fanatic	medium/big (≥ 4)	high (≥ 100K)	● ● ● ○ ○	Quality products, high levels of sales & technical service	

● ● ● ● ● High Long-term likelihood
○ ○ ○ ○ ○ Low Long-term lilelihood

Table 11 - Segmentation criteria and respective behavioural profiles

Industry and **location** stand as the elemental macro filters to ascertain more attractive business segments. Since Imeguisa is well-versed in the Automotive sector and lacks international experience, only companies operating in this industry will be considered as potential clients for the time being. Because Mexico is vast and approaching the country in its entirety would undoubtedly require engaging with multiple agents, focusing on specific regions is recommended. Players of the Mexican Automotive industry have established their operations in northern and central states; therefore, this should be the enlarged focus area. The number and type of production plants integrated within the Mexican Automotive industry indicate the state's concentration of "automotive activity". In the north, Coahuila, and Nuevo León were deemed most attractive for Imeguisa, with 5 and 2 production plants, respectively. The

attractiveness of Mexico's central region is even higher as far as potential clients are concerned, with states San Luis Potosí (3), Guanajuato (11), Estado de México (3), Puebla (2), Aguascalientes (4), and Morelos (1). With an annual vehicle production capacity surpassing 500,000 units (AMIA 2022), Coahuila, Guanajuato, Estado de México, Puebla, and Aguascalientes shall contain Imeguisa's highest potential clients.

Although it is possible to associate firmographic variables at the line level, particularly the **number of employees** and **revenues,** as they are both measures of company size, we have decided against making such connections since we believe that would lead to excessive restrictions *a priori*. Values for revenues, converted into US dollars, are according to standards established by Mexican Authorities. The annual revenue values in the original currency (MXN) are as follows: up to US$4M (micro firms); between US$4.01M and US$100M (small firms); between US$100.01M and US$250M (medium-sized firms); over US$250M (large firms) (GB&A Consulting n.d.). The focus should fall on large companies as they already constitute the bulk of Imeguisa's customer portfolio. Following the same vein, subsidiaries and heads of corporate groups would be the most beneficial **types** of companies to have as clients given their larger network. As buyers, these firms are more likely to rely on recommendations from peers (i.e., other subsidiaries of their group) or previous relationships, which widens Imeguisa's potential reach. Hence, with respect to firmographics, centrally located large firms integrated into a corporate group comprise Imeguisa's preferential clients in the Mexican market.

Going further, effective market segment evaluation requires companies to systematically address two fundamental questions: segment attractiveness and the company's relative ability to serve customer needs and, demand in that segment (Kotler and Keller 2016). Due to the lack of information on segment size and competitive landscape, attractiveness was assessed as a weighted average of the factors *price sensitivity* (25%), *order size* (25%) and *perceived likelihood of a long-term relationship* (50%) (see appx 29). More weight was given to the last

factor, as it indicates higher flexibility in the negotiation process and a more sustainable business opportunity for Imeguisa.

The matrix uses two dimensions, the "attractiveness" of the three different segments, and the company's current competencies in serving each segment, to determine the "strategic fit" between the segment's characteristics and the company's strengths and portfolio (Drummond and Ensor 2005). Overall, a high/low score (=3 or =1) in the segment attractiveness is associated with the highest/lowest potential of providing long-term profit to Imeguisa. In turn, a high/low score on strategic fit (=3 or =1) corresponds to a high/low fit between Imeguisa's offerings and customers' needs and preferences. More details about the allocated score in appx 51.

Figure 3 - Positioning of Customer Segments

One of the firm's strengths relies on the establishment of strong and long-lasting relationships with its clients, so-called partners. Nonetheless, as a weakness, although custom-specific variations characterise its offerings, Imeguisa does not offer the most technologically advanced and innovative solutions in the market. In brief, Imeguisa's priority target is **partnership-focused** companies, while Premium Fanatics are the least preferable.

9.3 Positioning

Positioning aggregates the value proposition, unique selling proposition, and positioning statement. As the value proposition (VP) is the promise of value the company vows to deliver, Imeguisa's VP is to develop innovative intralogistics solutions, tailored to its clients' needs. As for the unique selling proposition, Imeguisa offers customised, good-quality products that arrive on time, and a customer experience that entails after-sales service and ensures client satisfaction through relationship commitment.

Lastly, the positioning statement combines the value and the unique selling proposition, also specifying the company's target, and the segments to whom the company is offering superior value. Below, Imeguisa's positioning statement:

"To well-established car manufacturers keen to partner up, Imeguisa is a company developing customised innovative intralogistics solutions, ensuring on-time reliable delivery, ease of doing business, after-sales care, and customer satisfaction. In Imeguisa, your company will find the right technology partner for efficient industrial innovation."

Additionally, a perceptual map was drawn to better understand Imeguisa's positioning vis-à-vis the customers segments.

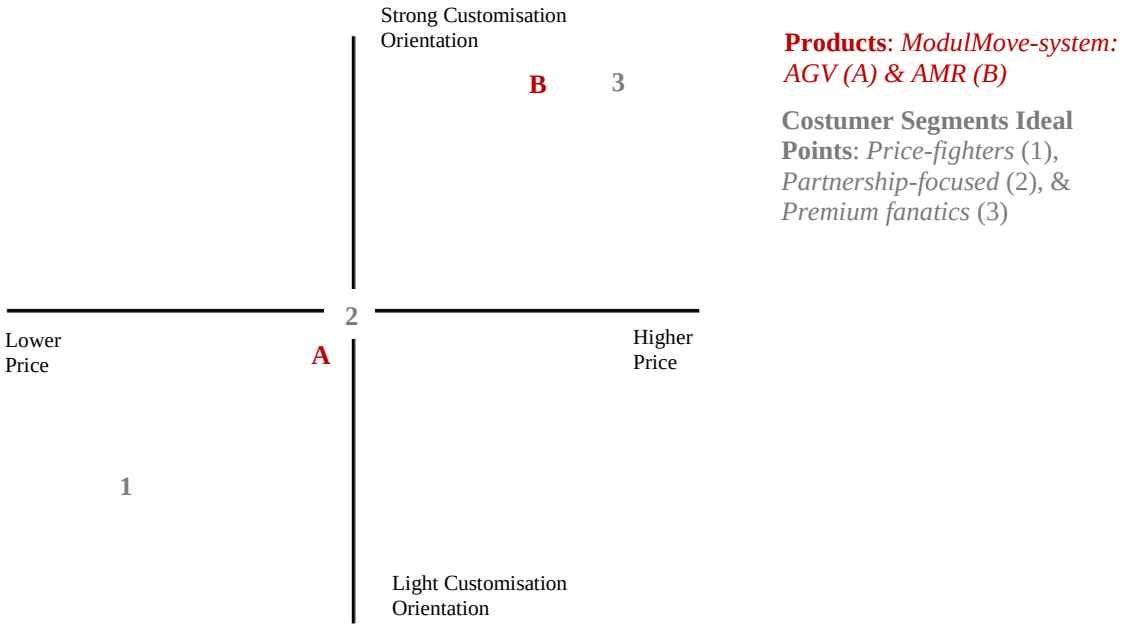


Figure 4 - Imeguisa's positioning regarding customers segments

9.4 Marketing Mix (4Ps)

In the final part of the Marketing Plan concerning Imeguisa's internationalisation project, the marketing mix will be the final step, evaluating Product, Price, Promotion and Place. When entering a new market, particularly a different market as Mexico, Imeguisa needs to adapt the strategy to focus on the new market conditions.

Developing an accurate marketing strategy requires considering the company's vision,

resources, and strategy, to provide the precise tools to create the proper response from the new market. The 4Ps offer information regarding the product and the service provided by Imeguisa, as well as the precise strategies to stimulate demand in Mexico.

Regarding the **product**, for the abroad experience, Imeguisa offers a product mix breath of one line, the *ModulMove*-system, with its product line depth. Inside, Imeguisa presents the AGV & AMR as solo items within the product line, which can be fully customised (appx 52).

Nevertheless, instead of just being responsible for producing and customising the products, Imeguisa could focus on creating partnerships to ensure the installation of the equipment on the place, and the after-sales service, since both products require more technical and complex maintenance. In addition, the partner would oversee the repair of the products, in cases of malfunction, or general maintenance, being carried out an annual questionnaire, to assess satisfaction with the quality of the service provided.

Furthermore, Imeguisa should take into account the product's life cycle as a planning tool as it provides indicators about changes in the product, allowing the company to react on time. Imeguisa offers a 1-year warranty for the products, which have a life expectancy of 10 years.

Regarding shipping to Mexico, Imeguisa should consider the regulation concerning labelling. In Mexico, labels must contain Imeguisa's name, the description of components, as well as risk warnings, if needed, and must always include "Produced in" or "Made in". Besides, such details must be written in Spanish, and the metric system must be used (Santander 2022).

The second element of the marketing mix is **promotion**, i.e., how Imeguisa would attempt to communicate, inform, and persuade consumers about available products. As of now, the firm's marketing activities are not very developed, and promotion depends heavily on word of mouth.

To start, Imeguisa could bring in a new marketing specialist to support the marketing & communication department, increasing brand awareness. This strategy could be highly valuable, essentially as the first step in Imeguisa's expansion.

Additionally, Imeguisa could continue to promote its business at Logistics Fairs, emphasising on the *ModulMove-system,* as well as on having the 'Mexican experience'. In this initial stage, Imeguisa's participation should be just as a visitor since participating as an expositor is a costly investment. As a visitor, these events are precious for Imeguisa, as they allow the company to expand its visibility, and look at the industry's latest trends and developments. Besides, they are a valuable opportunity to establish contacts with potential clients or partners. Later, Imeguisa could start participating as an exhibitor, displaying its best attributes. Appx 53 lists future Logistic Fairs, highlighting the *Mexicali Supply Expo*, and the *EXPO Manufactura*.

Moreover, Imeguisa could continue to invest in Google ads as a platform for direct advertising on the main search engine. As so, Imeguisa could create personalised messages, ideally in Spanish, to reach new potential clients. Furthermore, a newsletter, via email, could be created with the intention of boosting client retention, through the display of new offerings.

Lastly, Imeguisa could improve the website, by adding the English and Spanish language, as well a currency converter, including EUR, USD, and MXN, to decrease psychological distance to new clients in foreign markets. Also, Imeguisa should enhance the platform in terms of clear communication, services/products available, information regarding duties and taxes, which are the client's responsibility, and a section dedicated to enquiries. In addition, to enhance consumer experience, Imeguisa could add a simulation feature, providing information on delivery options and times, and an overview of the solutions offered.

Concerning the **price**, Imeguisa follows a value-based pricing strategy in the products sales, meaning that prices are set at a level that matches the value the product represents for consumers. In contrast to cost-plus pricing, the focus here is on the customer's willingness to pay rather than on production costs. This strategy works best for differentiated and valuable products, whereas commodities lack the basis for this strategy. For the products offered by Imeguisa, the attributed value increases due to the reliability of the good-quality products, and

to the elevated level of innovation. Specifically, Imeguisa can offer AGVs for a price of 21 605€ per piece and AMRs for 51.854€ per piece ex-factory whereas the total price for a fully operational AMR solution is around 60.000€ because they must be specifically adapted and configured to fit the buyer's operational needs. The price will vary according to the expected inflation for Mexico, during the forecasted period. Shipping is organised and paid by the client while on-site installation and (preventive) maintenance is facilitated by Imeguisa's partner and billed by Imeguisa, representing another potential source of revenue. However, Imeguisa is willing to negotiate and offers discounts to repeat clients, promoting the consolidation of long-term customer relationships. Comparing these prices with market prices, two things stand out. For AGVs, Imeguisa is below the market price of around 30.000€ in Mexico, and for AMRs it is well above the market price of around 14.000€. However, since this market price is purely related to the device and Imeguisa's existing customers are focused on the product's reliability and innovation, as a guarantee of success of the final solution, the price set for AMRs seems high but achievable. Furthermore, Imeguisa cannot afford to battle the competitors on price. Rather, the company is solely focused on selling quality and innovative solutions.

In terms of **place**, since segmentation and targeting provide very precise directions, there are also special requirements for the dimension of place in the marketing mix. Furthermore, this category has certain restrictions due to the corporate structure, selected entry mode and financial framework condition. One of these is, for example, not sending sales employees on business trips without a clear objective. Central importance is attached to the website, serving as the central point of contact for customers through revisions and special adaptations to the Mexican market. The range of services and a comprehensive product presentation, including terms & conditions, and contact details are available in a separate customer area. However, the website does not represent a trading place/selling channel per se, as the overall solution provided by Imeguisa always involves a large proportion of service and customisation. The deal effectuation

occurs afterwards over e-mail correspondence, telephone, and video conferences, in which the possibilities of presenting worked out concepts and of explaining the offered solution to the customer through virtual simulations also exist. Sales are carried out from Imeguisa's premises in Palmela, Portugal, whereby the targeted use of technology means that no restrictions on the quality of the sales process are expected and consequently, no hurdles are posed to the sale. Over time, it is also conceivable to involve local partners more in the sales process or to offer the solutions on B2B marketplaces such as b2bmap, a platform used in Mexico.

10 Financial forecast

All the assumptions employed in the following sections are summarised and described in the *Briefing* table, in appx 54.

10.1 Operational plan

10.1.1 Revenue estimation

Imeguisa is expected to engage in a slow-paced and incremental internationalisation strategy with limited scalability due to its intense competition and managerial constraints.

In the first year (2023), Imeguisa’s primary aim would be to establish ground in the Central Region of Mexico by securing a key client with long-term relationship potential. Out of the 16 clients (12 companies) fitting Imeguisa’s targeted customer profile with production facilities in the Central States deemed most attractive in **9.2** (San Luis Potosí, Guanajuato, Estado de México, Puebla, Aguascalientes, Morelos), the following firms were singled out as being more promising first clients: General Motors, BMW, Volkswagen, Mercedes-Benz, Nissan, Stellantis. The underlying reason for such selection is the fact that, as these firms are already Imeguisa’s clients in Portugal (Mercedes-Benz through Mini, and Stellantis through Peugeot), a privileged communication channel can be established via the Portuguese subsidiaries of these multinationals. When questioned, Imeguisa stated to prefer Volkswagen. Given the current limited production capacity of the Portuguese SME, and as mentioned in **9.2**, medium-sized

orders are favourited. Hence, the order size volume for 2023 would amount to 4 AGV units and 4 AMRs separately, totalling an average order value of 144k €. For reference, inflation rate forecasts for Mexico respective to the period between 2023 and 2027 (Statista 2022b) were incorporated into the country's calculation of AGV and AMR product price. A contract duration of 2 years will be assumed from here on out for all clients unless stated otherwise, with the automated equipment being distributed evenly throughout the years (equally sized orders), accompanied by the respective annual payment of the products received. This allows for higher accuracy of demand forecasts as well as an increased ability to manage better internal operations. Part of a set of customer retention policies, a discount of 5% of total project price would be granted to repeat clients, thereby rewarding loyalty. After-sales revenue sources such as installation, preventative maintenance and potential repair services were also evaluated. Installation was computed as a sum of a base price of 11k€ per order and other related expenses per visit (e.g, transportation, accommodation & food (on average, 3 people and 10 day stay)). Preventative maintenance fees were accounted for, corresponding to 15% of the client's total project price per year. A basic preventative maintenance plan of one year (beginning after the end of the warranty period) was assumed as the default option, assuming only three clients would purchase an 'extra-year plan'. In turn, repair fees were ultimately disregarded as inputs for estimating Imeguisa's revenues in Mexico, as their value was assumed to be fully discounted and transferred to the local partner(s) providing such services (appx 55).

In 2024, Imeguisa's primary strategic goal is to reach another client located in Central Mexico, intending to build a reliable client portfolio slowly but surely. Therefore, in addition to Volkswagen, a contract would be secured with another "existing client". The AMRs demand in the Mexican Automotive sector has been computed to grow at a CAGR of 21,75% between 2022 and 2027, whereas the analogous AGVs demand is estimated to increase at a much lower CAGR of 10,25% (please refer back to appx 59) for the same forecasted period. Such difference

in demand is due to AMRs' greater autonomy and ability to perform a broader range of tasks in comparison to AGVs. As a result, AMRs offer more options than AGVs and are likely to provide more significant efficiency gains. Buyers can thus be expected to prefer AMRs, which will, in turn lead to a cannibalisation of sales of AGVs. Hence, from 2024 onwards, a change in the order size will occur with the AMRs' sales volume estimated to be 5 units until 2025 and 6 afterwards while AGVs volume is expected to remain 3 units. Parallelly, the AMRs client base will increase by 2 in each year while the AGVs client base will rise by 1. This additional revenue growth will mainly emanate from: constant improvements to Imeguisa's website; the intermediary activity of local partners; presence on locally relevant ecommerce platforms (i.e., B2bmap) and incremental investments in other online marketing strategies such as Google Ads. By 2027, Imeguisa is expected to secure its position in this region, through a new AMR deal with a previous client for another plant. Overall, between the forecasted period, the sales revenue was expected to grow at a CAGR of 62,20%, reaching the value of 2.149.313€ by the end of 2027. Moreover, Imeguisa will be conquering 2,52% of the Mexican market, with an average order value of 268 152,60€.

In the long run, a steady state is projected with a slow linear revenue growth which takes part in a more extended internationalisation process, deviating from a reactive orientation. This plan was divided in two main sub-strategies: Northern Region expansion focusing on the partnership-focused niche and premium fanatic's segment capture in the Central Region. Nonetheless, the financial forecast did not fully exploit this second process stage.

10.1.2 Cost Estimation

The Costs of Goods Sold (**COGS**) are independent of Imeguisa's increased output production as they represent directly allocable variable costs and are therefore incurred in the same proportion as before. It is conceivable that additional volume discounts would be available due to larger order quantities, but these were disregarded from the conservative calculation.

Nevertheless, to determine the expected COGS, these were calculated as a percentage of sales. Values were taken based on the net margin from previous years and projected into the future. According to Imeguisa's insights, the overall net margin of both products was around 20% in Portugal. Hence, for the sake of simplicity, 60% of the sales revenues was assumed as COGS, excluding the costs associated to the after-sales services. In addition, the costs related to installation, repair and maintenance take the form of commissions to Imeguisa's local after-sales partners. They are responsible for complete on-site handling, including commissioning and after-sales support. These costs, except repair fees, are billed by Imeguisa, but the actual service is provided by a third party, which is why 95% of the 'other revenues' flow to the partner company. Repair fees are fully discounted and collected by the local partner providing this service. This proportion will be assumed constant during the forecasted period.

Besides the COGS, the company, as a reaction to the expected demand boost, should increase the production capacity; thus, more **employees** may be necessary to help the company fulfil the orders. Firstly, a marketing specialist would be hired, in 2023, to help Imeguisa's marketing & communication department, but also to increase social media awareness, mainly through LinkedIn, representing a cost of 14.600€ per year (Glassdoor 2022c). As the company and the demand grow, the production capacity should accompany their growth; as such, new engineers would be hired in 2024, 2026, and 2027, amounting to a cost of 22.500€, 45.000€ and 67.500€ respectively (Glassdoor 2022b). Further, a new commercial would be hired to help respond to new requests, representing an annual cost of 13.600€ (Glassdoor 2022a).

In addition, Imeguisa will incur **website development and maintenance** costs. The website would be improved to become a portfolio website, displaying an overview of the solutions offered. In the first year Imeguisa would spend around 3.900€ on website improvement. And by 2026, the website would suffer a content update, costing 2.000€. During the project, the company would spend 216€ per year in maintenance (Monaghan 2022; SPD 2022).

For marketing purposes, Imeguisa should continue to invest in **Google Ads**, thus representing an estimated cost of 2.400€ for the first year The cost per click was assumed to be 4€, with an estimated 50 clicks per month. During the following years, the number of clicks would increase by five every year, therefore, the cost in Google adds, would be range from 2.640€ to 3.360€, between 2024 and 2027 (McCormick 2022).

Participating in **Logistics Fairs**, even just as a visitor, still represents a cost, with flights, hotel, food, and transportation. It was assumed that the company would participate every two years, with two people. As such, the participation cost in the *EXPO Manufactura* would ascend to 1.800€, while the participation in the *Mexicali Supply EXPO* would amount to around 2.200€, performing a total of 4.100€ (Google Flights 2022a,b; Numbeo 2022). Although mentioned in the Promotion sub-chapter, participating in Fairs as an exhibitor still implies a hefty investment, therefore it was not considered, during this project, and should be reassessed in future years.

In the previous international transactions, Imeguisa transported the goods to the place of **shipment** and the subsequent transportation arrangements were organised, insured, and paid by the customer. For this reason, we assume that this is how Imeguisa will continue to work in the future, so only the transportation costs from the factory to the seaport in Portugal will have to be paid by Imeguisa. There are several ports available, but the ports in Lisbon, Setúbal, and Sines are preferred due to their proximity to the company's location. However, transportation costs depend not only on the distance travelled but on a variety of other factors and therefore cannot be accurately determined. Ti, Upply and IRU (2020) write of 3.2€ per kilometre travelled in road freight for trips less than 200 kilometres. Since various global economic events have since led to an increase in prices, especially in the transport sector, prices were assumed to be 50% higher and thus a price of 4.8€ was calculated. However, due to the geographical proximity to the ports, these transport costs are marginal in the overall consideration with an average of 288€ per order.

To keep the costs accurate, the **overhead costs** incurred by existing company structures must also be included in the project valuation. They were assumed to be 15% of the operational costs (personnel, distribution, and marketing expenses), which roughly reflects the current cost structure, and represent overhead costs in the classic sense, such as administrative costs.

10.1.3 Operational risk analysis

All businesses depend on market conditions and different factors, such as the company's wealth and industry specifics. Imeguisa, a small firm, is more exposed to those risks, particularly market conditions. Changes in legal factors, such as taxation or tariffs, could significantly impact Imeguisa's internationalisation in Mexico. Besides, new technological advances, if not followed by the company, could mean a strong reaction from the competition, increasing the difficulty of doing business.

In addition, the events of the last few years have shown that the world can change quickly and consequently shake companies to their foundations and put them at risk. The pandemic, the Ukraine war and, the sharp rise in inflation, particularly in energy prices, in the eurozone pose an enormous challenge, especially for smaller, less resourced companies like Imeguisa, and will naturally influence their actions. For example, Imeguisa has placed the expansion of its production facilities on hold provisionally due to the pandemic. All these and possibly future events represent a risk for the internationalisation project.

Yet there can also be changes that positively influence the company. One case might be a competitor withdrawing from the Mexican market, leaving a gap to be filled, which Imeguisa could benefit from. Moreover, all cost estimates were made considering Imeguisa's size. As such, internationalisation could represent an expansion of the company. Intrinsically, the Portuguese SME may have to review the entry conditions, evaluating alternative modes of market entry, and executing bigger investments, to respond to bigger requests. An increase in Imeguisa's size might correspond to more extensive and significant costs, such as the

participation as an exhibitor at international logistic fairs, and the increase in production capacity, with larger facilities and more employees.

10.2 Investment plan

When looking at an internationalisation project, the potential company growth stands out. To comply with the demands of the new international experience, Imeguisa will have to incur some of the costs mentioned in the previous sub-chapter. However, it will also have to make investments, in production capacity, with new and more efficient machinery, which will enable it to fulfil the new orders coming from Mexico, without harming the operations in Portugal. All the new investments in this project will be made by resorting to the company's own resources. The eventual expansion of the facilities will be carried out through a bank loan, according to Marta Filipe, Product manager at Imeguisa.

10.2.1 Capital expenditure

To comply with these requirements, an investment of 50.000€ per year has been considered for the equipment, including in 2022, in anticipation of what 2023 may bring. The equipment investment represents annual depreciation, which began in 2023 with a value of 6.250€, the result of multiplying the investment by the Depreciation Rate of 12.5% (PWC 2022a). Furthermore, it will increase to precisely 6.250€ per year, because of the 50.000€ invested yearly for this purpose. In terms of salvage value, although the equipment is usually expected to have a useful life of ten years, and the evaluation of the project has been made for five years, we consider that on reaching the 5^{th} year, the project will become a perpetuity. Because the equipment will be used after the 5^{th} year, there will be no salvage value.

10.2.2 Investment in Net Working Capital

In terms of investment in NWC, it was assumed that Imeguisa would not have any inventory, as it produces according to orders. The Accounts Receivable were calculated using the average weight on Revenues. As for the Accounts Payables, the average weight on COGS was used.

Then, the Accounts Receivable were imputed by multiplying the percentual average with the future revenues, while the Accounts Payable were calculated by multiplying with the future COGS. The Accounts Receivable started at 134.471€ in 2023, and ascended to 815.486€ in 2027, while the Accounts Payables begin at 39.350€ in 2023, reaching 272.507€ in 2027.

10.3 Financial viability

10.3.1 P&L Statement & Free Cash Flows

After analysing all the cost estimates and considering that Imeguisa will not incur in any financial loan to support the internationalisation, thus not having any financial expenses, the net income will be the result of the revenues subtracted from all costs and depreciations, plus deducting taxes to the government. With a tax rate of 21% (ePortugal 2022), in 2023, Imeguisa's net income for this project would be 66.071€, reaching 469.815,58€ in 2027. For instance, Imeguisa would be able to sustain a gross margin over 35% and a net margin over 21% during the forecasted period (see appx 56).

Moreover, looking at the Free Cash Flow (FCF), the sum of the current operations with the investments in capital expenditure and NWC, it would be negative in 2023 and 2024, because the investments were bigger than the cash flow generated from the operations. From 2025 on, it would continue to grow, reaching 392.621€ in 2027 (see appx 57).

10.3.2 WAAC Calculation

The Weighted Average Cost of Capital (WACC) is calculated by the sum of the cost of debt multiplied by its weight in the capital structure and the cost of equity multiplied by its weight in the company's capital structure. This sum is then multiplied by (1- tax rate), resulting in a **WACC of 8.18%.** First, the debt and equity ratios were calculated using the financial information available on Orbis. The weight of debt for Imeguisa is 0.065 and of equity is 0.935. The company's debt-to-equity ratio is 0.07. Portugal's 10-year bond yield was used as a proxy to determine the cost of debt for the company. Currently, the bond yield averaged a cost of debt

of 2.828% (Trading Economics 2022b). In turn, the Unlevered beta had to be calculated first to calculate the Levered beta necessary for the cost of equity. An industry Levered Beta of 1.06 and an average industry debt-to-equity ratio of 0.2559 was used (Damodaran 2022). The calculation result was an Unlevered Beta of 0.88. With the previously calculated Unlevered Beta and a tax rate of 21%, the new Levered Beta equalled 0.93. Finally, the sum of the market free rate with the multiplication of the Levered Beta and the Market Risk Premium (6.2%) needs to be done, to calculate the cost of equity (Statista 2022a). Hence, the cost of equity is 8.595%.

10.3.3 Project Valuation

Various key metrics were calculated to understand the project's impact better and assess the project's viability. The internationalisation plan follows the Terminal Value method to assess the financial viability of the exportation activity in Mexico under the assumption that Imeguisa's business model, production and product portfolio would be matured, which generates predictable cash flows (Copeland and Koller and Murrin 2010). The real GDP growth and inflation in Mexico comply with OECD predictions over 2021-23 and later steadily approach the potential output growth and the inflation target rate of 3%, respectively (OECD 2022c). Hence, one expects that after 2027, Imeguisa will continue growing at the same rate as the economy, by reinvesting the cash flows generated in assets, resulting in a terminal value of 7 804 788€. Overall, by applying the discounted cash flow method, the **NPV is 5.608.540,17€**.

The second metric, the Internal Rate of Return (IRR), determines the profitability of potential investments (Fernando 2022a). The IRR for this project is **157,26%** higher than the cost of capital (WACC), pointing out the attractiveness of this project. The last metric is the Profitability Index, which measures the relationship between the costs and benefits of the evaluated project (Chen 2022). A Profitability index of **113,17** confirms the conclusions made with the IRR. The projected sales exceed the estimated Break-Even Point every year, which gives the project a positive margin of safety for the years 2023 to 2027 (ranging between **75%**

to 84%). For instance, a growing break-even is expected during the forecast period, starting with 71k€ in 2023 composed of 1 units of AMR and AGV and reaching 303k€ in 2027, with 1 unit of AGV and 5 units of AMRs. Lastly, Imeguisa would need 4 years and 6 days to recover the investment, being the exportation project only profitable after 2026 (see appx 57).

10.3.4 Sensitivity and Scenario Analysis

First, a sensitivity analysis was carried out to investigate the influence of individual factors on the net present value and the internal rate of return of the project. This analysis revealed the effects of Average Order Value, COGS, Partner Commission and Discount Rate on the dependent variables. The results show that the Average Order Value, the COGS, and the Discount Rate strongly influence the NPV and IRR, whereas the influence of the commission paid to the local partner is only slight. Consequently, the implication is that the factors that have heavily affect must be closely monitored, and any changes should be acted upon. If the Average Order Value decreases, then it can be reacted to by specific efforts to increase it or by increasing the projects, whereby the latter measure does not increase the average but the total turnover. If the price of input factors, such as materials, rises, one could specifically look for substitutes, or increase the sales price to compensate for the increased COGS. If the discount rate is increased, the capital structure will have to be examined, and possibilities for reducing the cost of equity and debt will have to be evaluated (see appx 58).

In turn, the scenario analysis relied only on fluctuations in market conditions based on up-to-date reports - economic forecast of Mexico for the second quarter and of the U.S. for the third quarter of 2022 - provided by Deloitte and complemented by the Mexico economic snapshot report from OECD. Nonetheless, factors relating to firm’s competitive advantage (no change in price structure and product mix) and the scarce internal resources (no change in operation costs) were not acknowledged. In this analysis, only factors concerning the overall demand, price of raw materials and bargaining power over suppliers were considered.

The repercussions of Russia's invasion of Ukraine, such as hyperinflation of a range of commodities, and tighter monetary policy, were considered in 10.1.1 for the baseline scenario. Given Mexico's strong dependence on the U.S. business cycle (OECD 2022c), the probability of the baseline scenario is considered equally high (55%) (Deloitte 2022b).

On the other hand, the pessimist scenario is mainly branded by sticky inflation with more aggressive Central Bank tightening and by the near-certain recession in Mexico's leading trade partner, the U.S., in 2023 (Bloomberg 2022). Hence, a likelihood of 30% was attributed. Furthermore, this might lead to a sharp exchange rate depreciation and political disruption, which could hinder the execution of reforms and affect investment and medium-term growth prospects. In this case, Imeguisa would engage in a slow-paced exportation activity in Mexico with only a new order every two years while only operating full-time to serve the demand of two years contract. One is expected that Imeguisa's partner will demand higher yield (96%), and the COGs will achieve 65% of the revenues, resulting in a negative NPV of –2.203.699,23€

Under a comprehensive reform scenario, higher GDP growth can be assumed over 2022-2031 (OECD 2022c). Overall, this optimistic scenario was given a likelihood of 15%, mainly due to the anti-inflationary policies and oil subsidies and an increase in the inflow of FDI into Mexico in metal products manufacturing and continued growth in factory equipment investment (Deloitte 2022a). The optimistic scenario would lead to a faster penetration rate in the Mexican market over the forecasted period, with an incremental acquisition of 2 new orders each year, the COGS representing 55% of the revenues, and the partner commissions reduced to 90%. Consequently, the NPV would be 11.058.140,41€ with a high profitability index of 222, 16.

In general, the weighted average NPV will be 4.082.309,74€ with a profitability index of 82,65 if cash flows are generated forever at a steady pace. In brief, although not feasible as a short and medium-run strategy, Imeguisa is expected to follow a successful exportation strategy in the long run, after 2026 (see appx 59 & 60).

11 Conclusions and Recommendations

Imeguisa enjoys a comfortable position in the Portuguese market. Its client portfolio, composed of large renowned firms, is proof that the capabilities of the Portuguese Intralogistics provider are up to par with customers' needs and strict requirements. Innovation capability, sufficient capital availability, and product versatility of application have been ascertained to be key success factors within the industry where Imeguisa operates. The SME's home country offers relevant advantages in this field, with demand conditions deserving particular emphasis.

Pertaining to activities beyond national borders, the SME's past international experience lies exclusively in reactive exporting. Although this does not amount to solid internationalisation experience, it allowed the company to gain some valuable initial experience prior to proactively venturing into new markets (Ripollés, Blesa and Monferrer 2012). Albeit exporting is generally the most appropriate entry mode for conventional SMEs with little to no international experience, the choice of Imeguisa's entry mode also contemplated the need to establish service provision abroad. As ensuring service provision requires physical representation in the foreign markets where the firm has clients (Vendrell-Herrero et al. 2018b), we opted for a combination of indirect proactive exporting and partnerships with local businesses capable of guaranteeing technical assistance as well as all other on-site after-sales services on Imeguisa's behalf. Given the importance of personal relationships in Mexican business culture, Imeguisa should seek to leverage existing linguistic and cultural similarities, without disregarding interorganisational cultural differences, to avoid misunderstandings, conflict, and, ultimately, failure.

Nonetheless, it is also important to remark that the company may not currently be at a point where internationalisation would be in its best interest. Internationalisation may be unviable for the following set of reasons. A) the nature of Imeguisa's competitive advantage (the service provided, based on customisation, and supported by relationship commitment) is difficult to replicate elsewhere without setting up shop in the host country. B) this delocalisation of

operations to the foreign market is incompatible with C) the firm's scarce internal resources (i.e., capital, workforce) only allow for an export strategy, which can lead to a loss of competitiveness D) limited production capacity and inefficiencies in the manufacturing process. E) considerable supplier dependence, which compromises production when implying lengthy waiting times for components.

Imeguisa's organisational structure is coherent with its SME status – employees multitask, teams interact very much, some departments are attributed to a single person, and authority is centralised along with a defined chain of command. Imeguisa would benefit from implementing warehouse automation and integration of processes, as well as increasing its grounds since storage space is scarce and the lack of room hinders production capacity. Given that Imeguisa currently has no strategic plan devised nor Strategy dedicated department, the creation of one is deemed necessary for a successful geographical expansion. The implementation of strategic planning frameworks, such as the Balanced Scorecard, is recommended for Imeguisa to be able to assess its progress continuously. This is likely to positively contribute to the elimination of inefficiencies, in turn promoting higher levels of productivity. Furthermore, as international market expansion facilitates access to economies of scale, these economies can be leveraged to increase the overall net margin of Imeguisa. Various sources can lead to internal and technical economies of scale such as bulk purchasing and selling, hiring efficient and highly skilled managers, application of lean principles (Hu et al. 2015), and using technological advances to reduce production costs. A lean strategy will allow Imeguisa to focus on producing more with less input, eliminating waste (e.g., errors and duplicated tasks) throughout the manufacturing process. Hence, the establishment of a pull system and the promotion of employees' accountability as a trigger of continuous improvement are the suggested basis for increasing Imeguisa's efficiency and effectiveness at an operational level. Because of the dependence on third parties in the new market, the company should be careful to provide — in the local

language — all product information, such as training manuals, installation instructions and parts lists, and if needed live Q&A sessions to ensure successful product installation. As the levels of expectation and rights for a warranty vary by country, Imeguisa should carefully consider the terms of a product warranty in Mexico.

The company's strength lies in establishing strong and long-lasting relationships with its clients. Imeguisa offers customised, good-quality products with customer experience that entails after-sales service and ensures client satisfaction through relationship commitment. Although the company aims to offer innovative products within the industry, Imeguisa does not offer the most technologically advanced and innovative solutions on the market. For this reason, the company should prioritise partnership-focused clients and less clients that aim for the most technologically advanced solutions. To successfully reach its clients, the company should improve and update its website to display all its products and services in the required languages. Further investment in Google Ads will be needed to attract new clientele and increase the conversion rate on their website. In addition to online, further business should be done via email and telephone. As high awareness of customer needs and preferences is of utmost importance (Bhamu and Singh 2014), Imeguisa should ensure it systematically measures customer satisfaction. Such insights will contribute to managing business relationships better, thus amplifying long-term relationship potential and loyalty. Lastly, the company could add a simulation feature to further improve the customer experience on the website.

Financially, Imeguisa is in a stable position, with no indicators showcasing financial struggles. However, if the internationalisation project is pursued, Imeguisa will have to increase its financial resources to sustain the investment needed. To accomplish this, the company will have to increase its revenue growth at least by 3% in the long term and increase the value per order sold to 150.000€. With regard to the internationalisation project at hand, the prognostications suggest that it would be beneficial for the company, satisfying the proposed marketing goals

related to Imeguisa's financial position and market expansion. In addition, every metric calculated suggests a profitable outcome for the company. The ROCE and ROE suggest that Imeguisa could increase profitability through a more efficient channelling of the available resources, especially compared to peers' ratios. Further, the sensitivity analysis performed revealed the key factors of NPV to be the revenue, discount rate and COGS. After further analysing the asset turnover, by increasing the available space, the company could increase production efficiency. For the construction of additional production facilities, the company should use a loan to increase the value of Imeguisa due to the Tax Shield explained by the Modigliani-Miller Theorem (CFI Team 2022). As a final note, to increase its bargaining power over suppliers, Imeguisa could build up capital reserves, in anticipation of future fluctuations in supply prices. In the table below, the team's recommendations discriminated by perceived priority of implementation and the previously mentioned impeding factors addressed.

Recommendation	Priority	Imp. Factor Adressed
Leverage existing linguistic and cultural similarities, without disregarding interorganisational cultural differences.	🟢	1
Create an Office of Strategy Management (OSM) to oversee all strategy-related activities—from formulation to execution. Hire high-skilled managers or increase the investment in training at senior levels.	🔴	-
Implement strategic planning frameworks (i.e., Balanced Scorecard) and performance evaluation metrics (e.g., KPIs)	🟡	-
Increase grounds since storage space is scarce and lack of room hinders production capacity. Increasing the available space could also increase production efficiency.	🟡	3
Implement warehouse automation and integration of processes, aligned with Lean Principles.	🟡	3
Improve and update website to display all products and services in several languages.	🔴	2
Increase the capital allocated to Marketing investments, namely in Google Ads.	🟡	2
Put in place a system to regularly measure customer satisfaction.	🔴	-

Perceived urgency of implementation: 🟢 Low 🟡 Medium 🔴 High

Table 12 – Recommendations and perceived urgency of implementation

Limitations

This project consists of an outside perspective on Imeguisa; thus, all analyses may not be 100% accurate. In addition, a lack of industry knowledge and experience may alter some conclusions. By no means the conclusions made about the company are rigid. The lack of information and data compromises the accuracy of the project's findings. However, this project may provide deep insights into the company and the industry in which it operates. Such insights can be used as guidance for future key strategic decision-making on the part of Imeguisa.

12 References

Accace. 2022. “Doing Business in the Czech Republic: What Investors Need to Consider When Entering the Market.”. Accessed November 2, 2022. https://accace.com/doing-business-in-the-czech-republic/.

Advantis Tailoring Operational Solutions. 2020. “Automotive Industry in Turkey”. Accessed October 26, 2022. automobIle-dosyaen-568.pdf (advantisconseils.com)

AFIA. 2022. “Statistics: Auto Components Industry.” AFIA. Accessed October 26, 2022. https://afia.pt/en/statistics/.

AGV Network. n.d. “AGV Manufacturers worldwide”. AGV Network. Accessed October 31, 2022. https://www.agvnetwork.com/automated-guided-vehicles-manufacturers

Allen, R.S. and Helms, M.M. 2006. “Linking strategic practices and organisational performance to Porter's generic strategies” Business Process Management Journal, Vol. 12 No. 4, pp. 433-454. https://doi.org/10.1108/14637150610678069

Andersen, Otto, and Arnt Buvik . 2002. “Firms' internationalisation and alternative approaches to the international customer/market selection.” *International Business Review*. 11 (3): 347-363. http://dx.doi.org/10.1016/S0969-5931(01)00064-6

Arthur, David and Sergei Vassilvitskii. 2007. "k-means++: the advantages of careful seeding". Society for Industrial and Applied Mathematics Philadelphia. 1027–1035. ISBN: 978-0-898716-24-5

Asociación Mexicana de la Industria Automotriz (AMIA). 2022. “Plantas de Ensamble de Vehículos, Motores y Transmisiones de Empresas Asociadas.” AMIA. Accessed November 12, 2022. https://amia.com.mx/about/plantas_ensamble/

Atwell, Elaine. 2020. “How to Calculate & Improve Customer Retention Rate [Formula].” Zendesk. Accessed November 25, 2022. https://www.zendesk.com/blog/calculate-customer-retention-rate/#:~:text=Net%20Promoter%20Score%20(NPS)%20is.

Backer TE. 1995. “Assessing and enhancing readiness for change: implications for technology transfer.” NIDA Res Monogr 155:21–41.

Badorf, Florian, Stephan Wagner, Kai Hoberg, and Felix Papier. 2019.” How Supplier Economies of Scale Drive Supplier Selection Decisions”. *Journal of Supply Chain Management*. 55(3). http://dx.doi.org/10.1111/jscm.12203

Barney, Jay. 1991. “Firm Resources and Sustained Competitive Advantage.” Journal of Management 99-120.

BCSD Portugal. 2021. “Financiar a sustentabilidade Plano de Recuperação e Resiliência.” Accessed September 8, 2022. https://bcsdportugal.org/financiar-a-sustentabilidade-plano-de-recuperacao-e-resiliencia-atualizacao/

Benevides, Chris. 2022. “The Advantages and Disadvantages of Automated Guided Vehicles (Agvs).” Conveyco, Accessed September 12, 2022. https://www.conveyco.com/blog/advantages-disadvantages-automated-guided-vehicles-agvs/.

Blomberg. 2022. “Mexico Seen Falling Into Recession Alongside US in 2023“. Accessed December 7, 2022. https://www.bloomberg.com/news/articles/2022-10-17/mexico-seen-falling-into-recession-alongside-us-in-2023?leadSource=uverify%20wall

Bradford Jacobs. 2022. “Mexican Contracts”. Bradford Jacobs. Accessed November 4, 2022. https://bradfordjacobs.com/countries/north-america/mexico/mexico-employment-contracts/

Breia, Arménio F., Mário N. Mata, and Vítor M. Pereira. 2014. “Análise Económica e Financeira: Aspetos teóricos e casos práticos”. Rei dos Livros.

Brouthers, Keith D., and George Nakos. 2004. "SME Entry Mode Choice and Performance: A Transaction Cost Perspective.". *Entrepreneurship Theory and Practice.* 28 (3): 229-247 https://doi.org/10.1111/j.1540-6520.2004.00041.x

BTI. 2022a. “BTI 2022 Czech Republic Country Report.”. Accessed November 12, 2022. https://bti-project.org/en/reports/country-report/CZE#pos10.

Buckley, Peter J. 1989. “Foreign Direct Investment by Small- and Medium-Sized Enterprises: The Theoretical Background.” *Small Bus Econ.*1:89-100. https://doi.org/10.1007/BF00398627

Business Setup. 2022.“Company Registration in Czech Republic.” Www.businesssetup.com. Accessed November 12, 2022. https://www.businesssetup.com/cz/company-registration-in-czech-republic.

CEDEFOP. 2022. “European skills index.” CEDEFOP. Accessed September 25, 2022. https://www.cedefop.europa.eu/en/tools/european-skills-index

Chen, James. 2022. “Profitability Index (PI): Definition, Components and Formula.”, Investopedia. Accessed December 2, 2022. https://www.investopedia.com/terms/p/profitability.asp

Christensen, Poul Rind. 1991.” The small and medium-sized exporters’ squeeze: empirical evidence and model reflections.” *Entrepreneurship and Regional Development.* 3: 49-65. https://doi.org/10.1080/08985629100000004

Compare ISO 9001 + ISO 14001". 2022.” Integrated Standards Store.” Accessed September 14. https://integrated-standards.com/compare-management-system-structure/compare-iso-9001-iso-14001/#:~:text=ISO%209001%20is%20a%20Quality%20Management%20System%20%28QMS%29,approach%20for%20measuring%20and%20improving%20their%20environmental%20impact.

Conbiz. 2021. “Business Etiquette in Czech Republic”. Accessed December 8, 2022. http://www.conbiz.eu/information/articles/Business-Etiquette-in-the-Czech-Republic).

Copeland, Tom, Tim Koller, and Jack Murrin. 2010. *Valuation, Measuring and Managing the Value of Companie*s. 3rd ed. New York: John Wiley & Sons.

Crespo, Cátia F., Daniel A. Griffith, and Luis Filipe Lages. 2014. “The performance effects of vertical and horizontal subsidiary knowledge outflows in multinational corporations,” *International Business Review.* 23(5): 993–1007.

Czech technical university. 2022. “Czech Industry Analysis 2022: Smart Industry 4.0 technologies help in the crisis”. Accessed December 8, 2022. https://aktualne.cvut.cz/en/reports/20220606-czech-industry-analysis-2022-smart-industry-40-technologies-help-in-the-crisis

CzechInvest. 2018. “Infrastructure.”. Accessed November 12, 2022.. https://www.czechinvest.org/en/For-Investors/Doing-business-in-the-Czech-Republic/Infrastructure.

CzechInvest. 2019. “Mobility.” 2022. Czechinvest.org, https://www.czechinvest.org/en/Key-sectors/Mobility.

Damodaran, Aswath. 2022. “Betas by Sector”. Damodaran. Accessed November 29, 2022. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html

Das, A. 2021, January 29. “Unsupervised Learning Techniques using Python — K Means ++ and Silhouette Score for Clustering.” Accessed October 19, 2022, https://towardsdatascience.com/unsupervised-learning-techniques-using-python-k-means-and-silhouette-score-for-clustering-d6dd1f30b660

Das, T.K., and Bing-Sheng Teng. 1999. “Cognitive biases and strategic decision processes: an integrative perspective.” *Journal of Management Studies.* 36 (6):757-778.

De Marchi, Valentina, Eleonora Di Maria., and Stefano Ponte. 2014."Multinational Firms and the Management of Global Networks: Insights from Global Value Chain Studies. *Advances in International Management.* 27: 463-486. https://doi.org/10.1108/S1571-502720140000027009.

Dearing JW. 2018. “Organisational Readiness Tools for Global Health Intervention: A Review.” Front. Public Health 6:56. doi: 10.3389/fpubh.2018.00056

Deloitte. 2022b. “U.S Economic Outlook- June 2022.” Accessed December 7, 2022. https://www2.deloitte.com/us/en/insights/economy/us-economic-forecast/united-states-outlook-analysis.html

Doing Business. 2022. “Ease of doing business”. Accessed October 8, 2022. https://archive.doingbusiness.org/en/doingbusiness

Doran, G. T. (1981). "There's a S.M.A.R.T. Way to Write Management's Goals and Objectives", Management Review, Vol. 70, Issue 11, pp. 35-36.

Drummond, Graeme, and John Ensor. 2005. *Introduction to Marketing Concepts*. 1st ed. Oxford: Butterworth-Heineman

Dunning, J. H., & Lundan, S. 2008. “Multinational enterprises and the global economy (2nd ed.).” Cheltenham: Elgar

Dunning, John H. 1988. “The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions.” *Journal of International Business Studies*, 19(1): 1–31. http://www.jstor.org/stable/154984.

Encyclopædia Britannica. (n.d.) “Resources and Power.” Encyclopædia Britannica. Accessed October 5, 2022. https://www.britannica.com/place/Portugal/Resources-and-power.

ePortugal. 2022. “CORPORATE INCOME TAX RATES”. Portuguese Government. Accessed December 2, 2022. https://eportugal.gov.pt/cidadaos-europeus-viajar-viver-e-fazer-

negocios-em-portugal/impostos-para-atividades-economicas-em-portugal/imposto-sobre-o-rendimento-das-pessoas-coletivas-irc-em-portugal

European Commission. 2021. "Access2Markets: Trade Barriers". European Commission. Accessed November 2, 2022. https://trade.ec.europa.eu/access-to-markets/en/barriers/details?barrier_id=11280&sps=false

European Commission. 2022a. "Economic forecast for Portugal. European Commission" Accessed September 6, 2022. https://economy-finance.ec.europa.eu/economic-surveillance-eu-economies/portugal/economic-forecast-portugal_en

European Commission. 2022b. "SME Performance Review 2021/2022 - Portugal country sheet". European Commission. Accessed November 4, 2022. https://ec.europa.eu/docsroom/documents/50700

European Commission. 2022d. Review of 2022 Country Report - Czechia. 2022. https://ec.europa.eu/info/system/files/2022-european-semester-country-report-czechia_en.pdf.

European Parliament. 2012. "European SMEs and International Trade. Brussels: European Parliament", Directorate-General for External Policies of the Union

Evers, Natasha. 2010. "Factors Influencing the Internationalisation of New Ventures in the Irish Aquacultural Industry: An Exploratory Study," *Journal of International Entrepreneurship.* 8: 392-416. http://dx.doi.org/10.1007/s10843-010-0065-7

Fact.MR. 2022. "Intralogistics Market Analysis, By Component (Hardware, Software, Services), By End Use (Logistics, Food & Beverages, Retail & e-Commerce, Airports, Automotive, Chemicals, Industrial Manufacturing), By Region - Global Market Insights 2022 to 2032." Fact.MR. Accessed September 23, 2022. https://www.factmr.com/report/3446/intralogistics-market

Fact.MR. 2021. "Intralogistics Market forecast, Trend Analysis 2032". Accessed September 9, 2022. https://www.factmr.com/report/3446/intralogistics-market

Fahy, John. 1998. *The role of resources in global competition*. 1st ed. London: Routledge.122-135. https://doi.org/10.4324/9780203469309

Fernando, Jason. 2022a. "Internal Rate of Return (IRR) Rule: Definition and Example." Investopedia. Accessed December, 2.

https://www.investopedia.com/terms/i/irr.asp#:~:text=The%20internal%20rate%20of%20return,same%20formula%20as%20NPV%20does.

Fernando, Jason. 2022b. “Working Capital: Formula, components, and limitations”. Investopedia. Accessed October 6, 2022. https://www.investopedia.com/terms/w/workingcapital.asp

Fish, Kelly E., and Paula Ruby. 2009. “An Artificial Intelligence Foreign Market Screening Method for Small Businesses”. *International Journal of Entrepreneurship.* 13: 65.

Freedom House. 2021. “Portugal: Freedom in the World 2021 Country Report.” Accessed September 6, 2022. https://freedomhouse.org/country/portugal/freedom-world/2021.

Freedom House. n.d. “Countries and Territories: Global Freedom Scores”. Freedom House. Accessed October 27, 2022. https://freedomhouse.org/countries/freedom-world/scores?sort=asc&order=Total%20Score%20and%20Status

Fusko, Miroslav, Miroslav Rakyta, and František Manlig. 2017. “Reducing of Intralogistics Costs of Spare Parts and Material of Implementation Digitization in Maintenance.” *Procedia Engineering* 192 (2017): 213–18. https://doi.org/10.1016/j.proeng.2017.06.037.

GB&A Consulting. (n.d.). “La clasificación de las empresas en México”. GB&A Consultoría, Impuestos y Servicios Legales. Accessed November 11, 2022. http://gbconsulting.com.mx/la-clasificacion-las-empresas-en-mexico/

Glassdoor. 2022a. “How much does an Commercial make in Lisbon, Portugal Area?”. Glassdoor Inc. Accessed November 25, 2022. https://www.glassdoor.com/Salaries/comercial-salary-SRCH_IM1121_KO0,9.htm?clickSource=searchBtn

Glassdoor. 2022b. “How much does an Engineer make in Lisbon, Portugal Area?”. Glassdoor Inc. Accessed November 25, 2022. https://www.glassdoor.com/Salaries/engineer-salary-SRCH_IM1121_KO0,8.htm?clickSource=searchBtn

Glassdoor. 2022c. “How much does an Social Media Manager make in Lisbon, Portugal Area?”. Glassdoor Inc. Accessed November 26, 2022. https://www.glassdoor.com/Salaries/social-media-salary-SRCH_IM1121_KO0,12.htm?clickSource=searchBtn

Gomes, E., Cohen, M. and Mellahi, K. 2011. “When two African Cultures Collide: A study of

interactions between managers in a strategic alliance between two African organisations." *Journal of World Business*, 46(1): 5-12.

Google Finance. 2022. "U.S. Dollars to Euro". Google Inc. Accessed October 25, 2022. https://www.google.com/finance/quote/USD-EUR?sa=X&ved=2ahUKEwiC3PXx0_n7AhVRVaQEHTF-CNQQmY0JegQIBhAc

Google Flights. 2022a. "Lisbon flights to Monterrey". Google Inc. Accessed November 24, 2022. https://www.google.pt/travel/flights/search?tfs=CBwQAhojagcIARIDTElTEgoyMDIzLTAyLTA2cgwIAhIIL20vMGIyaDMaI2oMCAISCC9tLzBiMmgzEgoyMDIzLTAyLTEwcgcIARIDTElTcAGCAQsI_____AUABSAGYAQE&hl=pt-PT&gl=pt&curr=EUR

Google Flights. 2022b. "Lisbon flights to San Diego". Google Inc. Accessed November 24, 2022. https://www.google.pt/travel/flights/search?tfs=CBwQAhojagcIARIDTElTEgoyMDIzLTAzLTIycgwIAxIIL20vMDcxdnIaI2oMCAMSCC9tLzA3MXZyEgoyMDIzLTAzLTIzcgcIARIDTElTcAGCAQsI_____AUABSAGYAQE&hl=pt-PT&gl=pt&curr=EUR

Gorton, G., Kahl, M. and Rosen, R.J. 2009. "Eat or Be Eaten: A Theory of Mergers and Firm Size." *The Journal of Finance*, 64: 1291-1344. https://doi.org/10.1111/j.1540-6261.2009.01465.x

Gripsrud, G. and G.R.G Benito. 2005. "Internationalisation in retailing: modelling the pattern of foreign market entry". *Journal of Business Research*. 58 (12): 1672-1680.

Grubert, H., and Mutti, J. 1991. "Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making." *The Review of Economics and Statistics*, 73(2): 285–93. https://doi.org/10.2307/2109519.

Hayes, Adam. 2021. "Understanding Internationalisation." Investopedia. Accessed November 22, 2021. https://www.investopedia.com/terms/i/internationalisation.asp.

Hayes, Adam. 2022. "Cash Flow definition". Investopedia. Accessed October 6, 2022. https://www.investopedia.com/terms/c/cashflow.asp

He, Xinming, and Yingqi Wei. 2011. "Linking market orientation to international market selection and international performance". *International Business Review* 20: 535-546,

http://doi.org/10.1016/j.ibusrev.2010.10.003

Hu, Qing, Robert Mason, Sharon J. Williams, and Pauline Found. 2015. "Lean implementation within SMEs: a literature review." Journal of Manufacturing Technology Management. 26 (7): 980-1012. https://doi.org/10.1108/JMTM-02-2014-0013

Iazzi, Antonio, Oronzo Trio, Andrea Pandurino, and Adriana Caione. 2015. “The evaluation of market attractiveness through the marketing intelligence approach: a tool for the SMEs”. *International Journal of Markets and Business Systems.* 1 (2): 92-107. https://doi.org/10.1504/IJMABS.2015.072264

IDC Portugal. 2022. Accessed September 8, 2022. https://idcportugal.com/

Imeguisa Group. 2022a. "Imeguisa General Presentation." Portugal.

Imeguisa Group. 2022b. "ModulMove-system." Portugal.

Imeguisa Portugal. 2022a. “História Imeguisa Portugal.” Accessed September 25, 2022. https://www.imeguisa.pt/historia.

Imeguisa Portugal. 2022b. “Missão, Visão, Valores.” Portugal.

Imeguisa Portugal. 2022c. “Your Technology Partner For Industrial Innovation.” https://www.imeguisa.pt/imeguisa/distincoes/.

INE. 2022. “Industrial Production prices grew 19.6- September 2022”. Accessed October 2022.https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdest_boui=540049905&DESTAQUESmodo=2

International Monetary Fund. 2022. “Countering the cost of living crisis”. Imf.org. Accessed December 5, 2022. https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022

International Organisation for Standardization (ISO). n.d. “ISO 9001:2015(en) Quality management systems — Requirements”. ISO. Accessed September 9, 2022. https://www.iso.org/obp/ui/#iso:std:iso:9001:ed-5:v1:en

International Organisation for Standardization (ISO). n.d. “ISO 9000 family Quality management”. ISO. Accessed September 9, 2022. https://www.iso.org/iso-9001-quality-management.html

International Trade Administration (ITA). 2022a. “Czech Republic - Trade Financing.”

Accessed November 12, 2022. https://www.trade.gov/country-commercial-guides/czech-republic-trade-financing.

ITA. 2021. “Portugal-Market Overview.”. International Trade Administration. Accessed September 8, 2022. https://www.trade.gov/country-commercial-guides/portugal-market-overview

Kaufman, Leonard, and Peter J. Rousseeuw. 1990. *Finding groups in data: an introduction to cluster analysis*. New York: John Wiley & Son

Knight, Don, Cathy C. Durham, and Edwin A. Locke. 2001.” The Relationship of Team Goals, Incentives, and Efficacy to Strategic Risk, Tactical Implementation, and Performance.” *Academy of Management Journal.* 44 (2): 326–338. https://doi.org/10.2307/3069459

Knight, Gary A, and S. Tamar Cavusgil. 2004. “Innovation, Organisational Capabilities, and the Born Global Firm”. *Journal of International Business Studies.* 35: 124-141. http://dx.doi.org/10.1057/palgrave.jibs.8400071

Knight, Gary A., and Peter W. Liesch. 2016. "Internationalisation: From incremental to born global". *Journal of World Business.* 51 (1): 93-102. https://doi.org/10.1016/j.jwb.2015.08.011.

Kotler, Phillip, and Kelvin L. Keller. 2016. *Marketing Management.* 15th ed. Harlow: Pearson

Kumar, V., Antonie Stam, and Erich A. Joachimsthaler. 1994. “An interactive multicriteria approach to identifying potential foreign markets,” *Journal of International Marketing.* 2 (1): 29- 52. https://doi.org/10.1177/1069031X9400200103

Kunday, Özlem and Ece Pişkinsüt Şengüler. 2015. “A Study on Factors Affecting the Internationalisation Process of Small and Medium Enterprises (SMEs).” *Procedia - Social and Behavioral Sciences*, 195: 972-981.

Lages, Luis Filipe, Carmen Lages, and Cristina Raquel Lages. 2005. “European managers’ perspectives on export performance determinants”, *Journal of Euromarketing.* 15(2): 75–92.

Lages, Luis Filipe, Graça Silva, and Chris Styles. 2009. “Relationship capabilities, quality, and innovation as determinants of export performance “. *Journal of International Marketing.* 17 (4):47–70. https://doi.org/10.1509/jimk.17.4.47

Lages, Luis Filipe, Vânia Fonseca, and Miguel Paulino. 2018. “The VCW-Value Creation

Wheel: A Framework for Market Selection and Global Growth". *Advances in Global Marketing*. 253-279. https://doi.org/10.1007/978-3-319-61385-7_11

Liberman-Yaconi, Leonardo, Terrena Hooper, and Kate Hutchings. 2010. "Toward a model of understanding strategic decision-making in micro-firms: exploring the Australian information technology sector". *Journal of Small Business Management*. 48 (1): 70-95. https://doi.org/10.1111/j.1540-627X.2009.00287.x

Lloyds Bank Trade.com. 2022. "Accounting and Accounting Rules in the Czech Republic - International

Trade Portal International Trade Portal." Accessed November 12, 2022. https://www.lloydsbanktrade.com/en/market-potential/czech-republic/accounting.

Luqmani, Mushtaq, Ugur Yavas, and Zahir A. Quraeshi. "A Convenience-Oriented Approach to Country Segmentation: Implications for Global Marketing Strategies." *Journal of Consumer Marketing* 11, no. 4 (1994): 29–40. https://doi.org/10.1108/07363769410070872.

Macdonald, Emma K., Michael Kleinaltenkamp, and Hugh N. Wilson. 2016. "How Business Customers Judge Solutions: Solution Quality and Value in Use." Journal of Marketing. 80 (3): 96-120. https://doi.org/10.1509/jm.15.0109.

Malsam, William. 2022. "What is Contract Manufacturing? Examples & Types.". Project Manager. Accessed November 4, 2022. https://www.projectmanager.com/blog/contract-manufacturing

Marchi, Gianluca, Marina Vignola, Gisella Facchinetti, and Mastroleo Giovanni. 2009. "International market selection for small firms: A fuzzy-based decision process". *European Journal of Marketing.* 48 (11/12): 2198-2212. https://doi.org/10.1108/EJM-09-2012-0512

Marketline.2022. "Companies". Accessed on September 30, 2022. https://advantage-marketline-com.eu1.proxy.openathens.net/Company/Index?recordtype=Companies

Mason, Charlotte H., and William D. Perreault. 1991. "Collinearity, Power, and Interpretation of Multiple Regression Analysis." *Journal of Marketing Research*, 28 (3). https://doi.org/10.1177/002224379102800302.

McCormick, Kristen. 2022. "How Much Does Google Ads Cost in 2022?". Word Stream.

Accessed November 25, 2022. https://www.wordstream.com/blog/ws/2015/05/21/how-much-does-adwords-cost

Modigliani, Franco, and Merton Miller. 1958. “The Cost of Capital, Corporation Finance and the Theory of Investment”. The American Economic Review 261-297.

Moen, Øystein. 2016. "The Relationship Between Firm Size, Competitive Advantages and Export Performance Revisited." *International Small Business Journal.* 18 (1): 53-72. https://doi.org/10.1177026624269918100 3.

Monaghan, Maura. 2022. “Website Maintenance Cost | 2022”. Website Builder Expert. Accessed November 25, 2022. https://www.websitebuilderexpert.com/building-websites/website-maintenance-cost/

Mordor Intelligence. 2022a. “Europe Automated Guided Vehicle Market Size, Report 2022 - 27.” Accessed November 12, 2022. https://www.mordorintelligence.com/industry-reports/europe-automated-guided-vehicles-market.

Morgan, Robert E, and Constantine S. Katsikeas. 1997a. “Theories of International Trade, Foreign Direct Investment and Firm Internationalisation: A Critique”. *Management Decision.* 35: 68-78. https://doi.org/10.1108/00251749710160214

Morgan, Robert E, and Constantine S. Katsikeas. 1997b. “Export stimuli: export intention compared with export activity”. *International Business Review*. 6: 477–99. https://doi.org/10.1016/S0969-5931(97)00017-6

Numbeo. 2022. “Cost of Living in Mexico”. Numbeo. Accessed November 25, 2022. https://www.numbeo.com/cost-of-living/country_result.jsp?country=Mexico

OEC. 2022. “Cars in Portugal.” OEC. Accessed September 8, 2022. https://oec.world/en/profile/bilateral-product/cars/reporter/prt.

OECD. 2021. *Taxing Wages 2021*. OECD Publishing. https://doi.org/10.1787/83a87978-en

OECD. 2022b. “Czech Republic projection note OECD Economic Outlook November 2022”. OECD Publishing. https://issuu.com/oecd.publishing/docs/czech-republic-oecd-economic-outlook-projection-no

OECD. 2022d. “Portugal. Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard.” OECD Publishing. Paris. https://doi.org/10.1787/e9073a0f-en.

OECD.2022e. “Financing SMEs and Entrepreneurs.” https://doi.org/10.1787/23065265.

O'Farrell, Patrick N., and Peter A. Wood. “International Market Selection by Business Service Firms: Key Conceptual and Methodological Issues.” International Business Review 3, no. 3 (1994): 243–61. https://doi.org/10.1016/0969-5931(94)90004-3.

O'Neill, Aaron. 2022. “Czech Republic - Share of Economic Sectors in the Gross Domestic Product 2021.” Statista, November 10, 2022. https://www.statista.com/statistics/369830/share-of-economic-sectors-in-the-gdp-czech-republic/.

Orbis. 2022. "Company Information across the globe.". Orbis. Accessed October 3, 2022. https://orbis.bvdinfo.com/version-2022930/Orbis/1/Companies/Search

Ozturk, Ayse, Eric Joiner, and S. Tamer Cavusgil. 2015.” Delineating foreign market potential: A tool for international market selection”. *Thunderbird International Business Review.* 57 (2):119-141. https://doi.org/10.1002/tie.21686.

Papadopoulos, Nicolas, and Jean-Emile Denis. 1988. “Inventory Taxonomy and Assessment of Methods for International Market Selection”. *International Marketing Review.* 5: 38-51. http://dx.doi.org/10.1108/eb008357

Papadopoulos, Nicolas, and Malhotra, Shavin. 2007. "Export Processing Zones in Development and International Marketing: An Integrative Review and Research Agenda". *Journal of Macromarketing.* 27 (2): 148-161. https://doi.org/10.1177/0276146707300070.

Passport. 2022. Accessed November 12,2022. https://www.portal.euromonitor.com/magazine/homemain/

Porter, Michael. 1980. “Competitive Strategy.” Free Press, New York. Accessed September 7, 2022.

Porter, Michael. 1985 “Competitive Advantage Creating and Sustaining Superior Performance” Free Press, New York, NY.

Porter, Michael. 1990. “The Competitive Advantage on Nations.” Free Press, New York. Accessed September 7, 2022.

Portugal Digital. 2022. “DIGITAL INNOVATION HUBS | DIH”. Portugaldigital.gov. Accessed November 4, 2022. https://portugaldigital.gov.pt/en/accelerating-digital-

transition-in-portugal/testing-and-incorporating-new-technologies/digital-innovation-hubs-dih/

PWC. 2022a. “Tax Guide 2022 | CIT”. PWC. Accessed December 2, 2022. https://www.pwc.pt/en/pwcinforfisco/tax-guide/2022/cit.html

República Portuguesa Direção Geral das Atividades Económicas (DGAE). n.d. “Rede de Polos de inovação digital”. DGAE.gov. Accessed November 4, 2022. https://www.dgae.gov.pt/servicos/politica-empresarial/competitividade/polos-de-inovacao-digital-dih.aspx

Rugman, A. M. 1981. “Inside the multinationals: the economics of internal markets.” New York: Columbia University Press.

Santander Trade. 2022a. “Mexico: Packing and Standards”. Banco Santander, S.A. Accessed November 26, 2022. https://santandertrade.com/en/portal/international-shipments/mexico/packaging-and-standards

Schein, Edgar H. 1992. *Organisational culture and leadership*. 2nd ed. San Francisco: Jossey-Bass Publishers

Senn-Kalb, Leonie, Luana Stefan, Aswathy Venugopal. “Manufacturing: Automotive Industry in the EU - Industry Insights & Data Analysis”. 2022. Statista. https://www-statista-com.eu1.proxy.openathens.net/study/78745/manufacturing-automotive-industry-in-europe/

SGEconomia. 2022. “Despacho n.º 11092-B/2021, de 11 de novembro - Reconhecimento de Polos de Inovação Digital adicionais “. Accessed December 7, 2022. https://www.sgeconomia.gov.pt/destaques/despacho-n-11092-b2021-de-11-de-novembro-reconhecimento-de-polos-de-inovacao-digital-adicionais-.aspx

Shepherd, Dean. A., and John Wiklund. 2005. *Entrepreneurial Small Businesses: A Resource Based Perspective”.* UK: Edward Elgar Publishing Ltd. https://doi.org/10.4337/9781845425692

SID Bank. 2021. “About Sid Bank.” SID bank, Accessed November 5, 2022. https://www.sid.si/en/about/about-sid-bank.

Simon, Herbert. 1987. *Decision Making and Organisational Design*. 2nd ed. New York: Penguin Books.

SPD. 2022. “How Much Does It Cost To Make A Website in 2022? Cost Breakdown”. SPD Load. Accessed November 25, 2022. https://spdload.com/blog/website-development-cost/

Statista. 2021b. “Average annual salaries in Europe 2021.”. Statista. Accessed September 25, 2022. https://www.statista.com/statistics/557777/average-annual-salaries-in-europe/

Statista. 2022a. “Average market risk premium (MRP) in Portugal from 2011 to 2022”. Statista. Accessed November 29, 2022. https://www-statista-com.eu1.proxy.openathens.net/statistics/664896/average-market-risk-premium-portugal-europe/

Statista. 2022b. “Mexico: Inflation rate from 1987 to 2027.” Statista. Accessed November 25, 2022. https://www.statista.com/statistics/275414/inflation-rate-in-mexico/

Statzon. 2022e. “Statzon | Global Industry & Technology Insights & Data.”. Accessed November 12, 2022. https://app.statzon.com/datasets/2YrGp.

Stray, Stephanie, Susan Bridgewater, and Gordon Murray. 2001. “The internationalisation process of small, technology-based firms: market selection, mode choice and degree of internationalisation”. *Journal of Global Marketing.* 15 (1): 7-29. https://doi.org/10.1300/J042v15n01_02

The Global Economy. 2022. “Political Stability by Country, around the World.” TheGlobalEconomy.com. Accessed October 25, 2022. https://www.theglobaleconomy.com/rankings/wb_political_stability/

The Group - Estanterías Industriales Imeguisa. 2022. ”Estanterías Industriales Imeguisa - Imeguisa. Expertos En Intralogistica. Estanterías Industriales Y Sistemas De Almacenamiento.” https://imeguisa.com/en/the-group/.

The Integrated Standards Store. n.d. “Compare ISO 9001 to ISO 14001”. Integrated Standards Store. Accessed September 9, 2022. https://integrated-standards.com/compare-management-system-structure/compare-iso-9001-iso-14001/#:~:text=ISO%209001%20is%20a%20Quality%20Management%20System%20%28QMS%29,approach%20for%20measuring%20and%20improving%20their%20environmental%20impact.

The Logistics IQ. 2022. “AGV (automated guided vehicles) and AMR (Autonomous Mobile Robots) market opportunity worth more than $18B by 2027 with an installed base of 2.4

million robots - driven by Logistics & Manufacturing, market forecast till 2027." Research and Markets - Market Research Reports - Welcome. Accessed November 1, 2022. https://www.researchandmarkets.com/reports/5398204/agv-automated-guided-vehicles-and-amr#:~:text=As%20per%20the%20publisher's%20latest,for%20AGV%20and%20AMR%20respectively

Thomson Reuters. 2021. "Doing Business in Portugal: Overview.". Thomson Reuters. Accessed September 6, 2022. https://uk.practicallaw.thomsonreuters.com/4-528-3105?transitionType=Default&contextData=(sc.Default)&firstPage=true

Ti & Upply & IRU. 2020. "The European Road Freight Rate Benchmark – Q2 2020." *Ti & Upply & IRU.*

Trading Economics. 2022b. "Portugal Government Bond 10Y". Trading Economics. Accessed November 29, 2022. https://tradingeconomics.com/portugal/government-bond-yield

Triton Market Research. 2022. "Europe Autonomous Mobile Robots Market 2021-2028." Www.tritonmarketresearch.com. Accessed November 12, 2022. https://www.tritonmarketresearch.com/reports/europe-autonomous-mobile-robots-market.

Trudgen, Ryan, and Susan Freeman. 2014. "Measuring the Performance of Born-Global Firms Throughout Their Development Process: The Roles of Initial Market Selection and Internationalisation Speed". *Manag Int Rev.* 54: 551–579. https://doi.org/10.1007/s11575-014-0210-y

UOOU.2002. "The Office for Personal Data Protection". Accessed November 12, 2022. https://www.uoou.cz/en/ The Office for Personal Data Protection: Home Page (uoou.cz)

UPV. 2022. "Industrial Property Office of the Czech Republic.". Accessed November 12, 2022. https://upv.gov.cz/en.

Van Buuren, Stef, and Catharina Groothuis-Oudshoorn. 2011. "MICE: Multivariate Imputation by Chained Equations in R." *Journal of Statistical Software*, *45* (3): 1–67. https://doi.org/10.18637/jss.v045.i03

Wei, H. 2020. “How to measure clustering performances when there are no ground truth?”. Medium. Accessed October 5, 2022. https://medium.com/@haataa/how-to-measure-clustering-performances-when-there-are-no-ground-truth-db027e9a871c**A**

Weinstein, Art. 2011. “Segmenting technology markets: Applying the nested approach. Marketing Intelligence & Planning”. 29(7): 672-686. http://dx.doi.org/10.1108/02634501111178695

Wessing, Taylor. 2019. “What is Management Contracting?”. Lexology. Accessed November 4, 2022. https://www.lexology.com/library/detail.aspx?g=c497e884-66c3-44e7-aff4-46471a9a30a8

Westhead, Paul, Mike Wright, Deniz Ucbasaran, and F. Martin. 2001a. “International market selection by new and small firms”. *Entrepreneurship and Regional Development.* 13:17–46.

World Bank. 2019. “Doing Business 2020: Comparing Business Regulation in 190 Economies”. The World Bank Group. https://doi.org/10.1596/978-1-4648-1440-2.

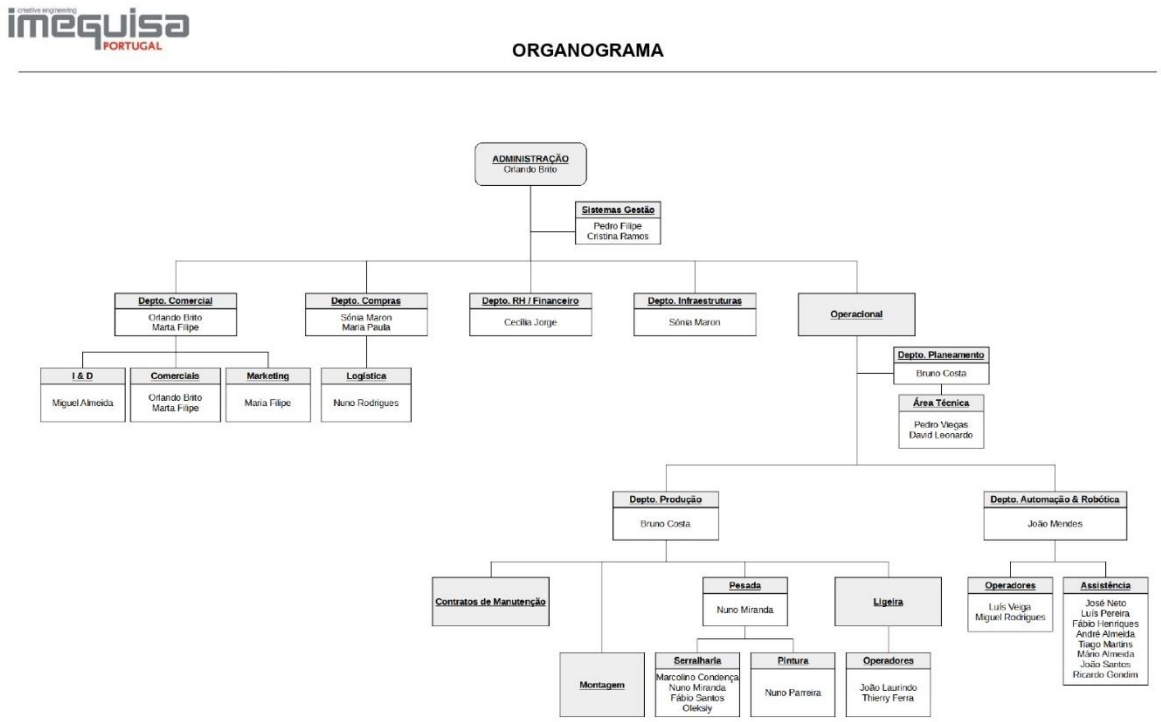
World Bank. 2020. “Trade (% of GDP Portugal)”. The World Bank Group. Accessed September 20, 2022. https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS?locations=PT

World Bank. 2021a. “GDP growth (annual %) – European Union.” The World Bank Group. Accessed October 31, 2022. https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=EU

World Bank. n.d.a. “Explore Economies.” The World Bank Group. The World Bank Group. Accessed November 12, 2022. https://archive.doingbusiness.org/en/data/exploreeconomies/czech-republic.

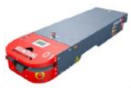
World Bank. n.d.b. “Gini index”. The World Bank Data. The World Bank Group. Accessed October 26, 2022. https://data.worldbank.org/indicator/SI.POV.GINI

13 Appendix



Appendix 1 - Imeguisa's 2022 Organisation Chart

Appendix 2 - AGVs

	CUSTOMIZED	360º drag	360º of elevation	STANDARD V3	STANDARD 4X4	LOWCOST	TRUCK
							
Length x Width x Heigth	Optional	945 x 771 x 200 MM	690 x 780 x 260/300 MM	1499 x 490 x 217 MM	1980 x 490 x 217 MM	800 x 500 x 200 MM	690 x 780 x 262/302
Traction Capacity	Optional	Up to 1200 KG	Up to 500 KG	Up to 1500 KG	Up to 2000 KG	Up to 400 KG	Up to 3000 KG
Direction	1 direction (Foward)	multidirectional (rotates on its own axis)	multidirectional (rotates on its own axis)	2 directions (Foward and backwards. Changes direction by 180º rotation)	2 directions + rotation on axes	multidirectional (rotates on its own axis)	Bidirectional + 360º rotation on its axis
Speed	up to 2 m/s	up to 2 m/s	up to 2 m/s	up to 2 m/s	up to 2 m/s	up to 2 m/s	up to 2 m/s
Minimum Viewing Radius	1000 MM	500 MM (on axis)	500 MM (on its axis)	1500 MM	1500 MM	500 MM (on axis)	500 MM (on axis)
Guidance Mode	Magnetic Band / Chromatic	Magnetic Band or SLAM		Magnetic Band / Chromatic		Magnetic Band / Chromatic	Magnetic Band or SLAM
Control Modes	TAG RFID					Bar code	TAG RFID
Monitoring System	Optional						
Communication Mode	Radio Frequency / WI FI					N/A	Radio Frequency / WI FI
Security	Sensor Lazer SICK					Detection of Obstacles	Sensor Lazer SICK
Batteries / Chanrging Mode	Gel or Lithium (24 V) rechargeable, automatic or manual					Gel or Lithium (24 V) manual recharge	Gel or Lithium (24 V) rechargeable, automatic or manual
Autonomy	20-24h						

Appendix 3 - AGV Customisation

Appendix 4 - E-Frame extensible

Appendix 5 - E-Frame Hydraulic & Electrical

Appendix 6 - H-Frame

Appendix 7 - I-Frame Single & Double

Appendix 8 - *ModulPipeSmart*-system, the "Flip Flop solution"

Appendix 9 - *ModulPipe*-system

Appendix 10 Examples of *ModulPacking*-system

Appendix 11 Examples of *Shop-Stock*

Appendix 12 Example of *Ponto Único*

Appendix 13 *Transtocker*

Appendix 14 *ModulVirtual-system*

Appendix 15 Example of Imeguisa's Racks

Appendix 16 Examples of Industrial Racking

IMEGUISA PORTUGAL - INDUSTRIAS METALICAS REUNIDAS, S.A.

Global ratios

	31/12/2021	31/12/2020	31/12/2019	31/12/2018	31/12/2017
Profitability ratios					
∟ ROCE (Capital Employed) (%)	5,54	10,62	11,56	7,37	11,22
∟ ROE (%)	5,25	10,85	11,75	6,73	10,15
∟ Profit margin (%)	10%	17%	16%	7%	8%
∟ EBITDA margin (%)	22,34	25,23	23,78	14,48	16,32
Efficiency ratios					
∟ Net assets turnover	0,52	0,60	0,71	0,97	1,09
∟ Collection period (days)	238	41	130	190	183
∟ Credit period (days)	191	137	139	181	157
Liquidity/Structure ratios					
∟ Current ratio (x)	2,87	2,56	2,87	1,85	1,77
∟ Liquidity ratio (x)	2,64	2,45	2,72	1,75	1,69
∟ Debt-to-Equity	0,07	0,18	0,07	0,12	0,24
Risk Ratios					
∟ BEP	1 339 781	1 355 356	1 318 751	1 936 811	1 595 561
∟ Margin of Safety	33%	40%	40%	27%	51%
∟ DOL	6,32	3,60	3,64	7,10	4,22
	836 967 €	1 013 269 €	1 020 962 €	941 410 €	1 527 706 €

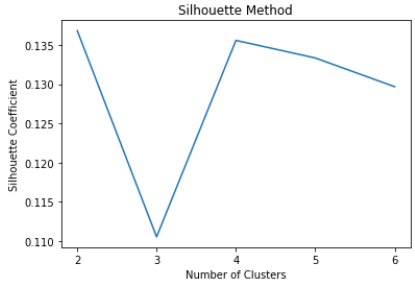
Appendix 19 - Global Ratios

∟ Tangible fixed assets	750 009 €	887 816 €	748 978 €	804 856 €	840 328 €
∟ Other fixed assets	59 651 €	106 876 €	244 527 €	120 772 €	681 561 €
Current assets	4 664 372 €	4 614 189 €	3 520 034 €	4 306 566 €	3 564 713 €
∟ Stock	367 482 €	191 535 €	184 678 €	228 079 €	158 902 €
∟ Debtors	1 327 471 €	259 162 €	847 367 €	1 484 648 €	1 701 780 €
∟ Other current assets	2 969 420 €	4 163 491 €	2 487 989 €	2 593 839 €	1 704 031 €
∟ Cash & cash equivalent	2 695 085 €	3 579 564 €	2 447 428 €	2 532 547 €	1 686 442 €
Total assets	**5 501 340 €**	**5 627 457 €**	**4 540 996 €**	**5 247 976 €**	**5 092 419 €**
Liabilities & equity					
Shareholders funds	3 741 335 €	3 545 104 €	3 160 502 €	2 789 227 €	2 601 495 €
∟ Capital	1 000 000 €	1 000 000 €	1 000 000 €	1 000 000 €	1 000 000 €
∟ Other shareholders funds	2 741 335 €	2 545 104 €	2 160 502 €	1 789 227 €	1 601 495 €
Non-current liabilities	133 299 €	276 483 €	154 682 €	128 219 €	476 134 €
∟ Long term debt	133 299 €	276 483 €	154 682 €	128 219 €	476 134 €
∟ Other non-current liabilities	0 €	0 €	0 €	0 €	0 €
∟ Provisions	0 €	0 €	0 €	0 €	0 €
Current liabilities	1 626 706 €	1 805 871 €	1 225 813 €	2 330 530 €	2 014 789 €
∟ Loans	126 848 €	362 561 €	61 460 €	206 597 €	155 020 €
∟ Creditors	1 061 063 €	870 127 €	904 204 €	1 417 784 €	1 457 171 €
∟ Other current liabilities	438 795 €	573 183 €	260 148 €	706 149 €	402 598 €
Total shareh. funds & liab.	**5 501 340 €**	**5 627 457 €**	**4 540 996 €**	**5 247 976 €**	**5 092 419 €**

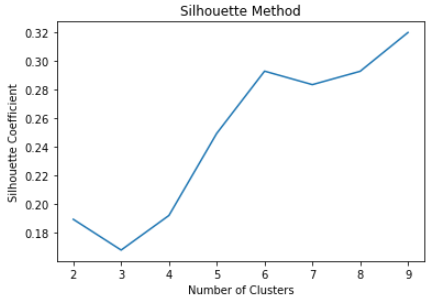
Appendix 18 - Balance Sheet (EUR)

Company	Operating Revenue	Employees	Product Affinity	Aerospace / Aeronautics	Agriculture	Automotive	Chemical / Pharma	Construction / Mechanical Top	E-commerce	Electronics	Energy	Fashion/Apparel/Textiles	Food & Beverages	(FM)CG	Furniture	Health & Wellness	Manufacturing / Industry	Mining	Logistics & Warehousing	Plastics	Retail / Wholesale	Transport	Global presence
MANITOU PORTUGAL, S.A.	26 277	39	1	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	140
JUNGHEINRICH (PORTUGAL), LDA	24 021	97	3	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	41
STILL, S.A.U - SUCURSAL EM PORTUGAL	21 264	53	3	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	1	0	10
LIEBHERR PORTUGAL, LDA	19 979	12	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	1	50
LINDE - MATERIAL HANDLING IBERICA, S.A. - SUCURSAL P	19 831	77	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	100
KORBER SUPPLY CHAIN PT, S.A.	38 048	218	2	0	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	1	20
BUROTICA - SOCIEDADE DE ESTUDOS E EQUIPAMENTOS	19 503	91	3	0	0	1	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1	30
I.F.M. ELECTRONIC - SUCURSAL EM PORTUGAL	3 953	8	1	0	0	1	0	0	0	1	1	0	1	0	0	0	1	1	1	0	0	0	50
KARDEX PORTUGAL, UNIPESSOAL LDA	2 683	4	3	0	0	1	1	1	1	1	0	0	1	1	1	0	1	1	0	0	1	1	30
4ITEC LUSITANIA, S.A.	1 750	6	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
4LEAN, LDA	3 305	30	3	1	1	1	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	1
EPL - SOLUCOES INDUSTRIAIS, LDA	4 300	9	2	1	0	1	1	0	0	1	0	1	1	0	0	0	1	0	0	0	1	1	0	1
GUEMBA ENGINEERS	2 191	17	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1
FOLLOW INSPIRATION, S.A.	801	16	2	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0	1	1	1	1
JUNGHEINRICH AG	4 808 261	19103	3	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	41
STILL S.P.A.	535 690	778	3	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	1	0	10
LIEBHERR IBERICA, S.L.	201 705	142	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	1	50
TOYOTA MATERIAL HANDLING EUROPE LOGISTICS AB	559 824	169	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	1	30
CGT LOGISTICA SISTEMI S.P.A. (CLS S.P.A.)	121 965	334	2	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	15
SEEGRID CORP.	51 600	342	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
DAIFUKU CO., LTD.	4 185 196	11697	3	0	1	1	0	0	1	1	0	0	1	0	0	0	1	0	1	0	1	0	26
DEMATIC LOGISTICS GMBH	18 575	92	3	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	1	0	35
HYSTER-YALE MATERIALS HANDLING, INC.	3 075 700	8100	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	12
HYSTER-YALE NEDERLAND B.V.	337 598	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	12
JBT AEROTECH UK LIMITED	27 578	116	3	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	25
JUNGHEINRICH UK LIMITED	254 906	760	3	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	41
CROWN GABELSTAPLER GMBH & CO. KG	251 021	1141	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	84
KION SOUTH AMERICA FABRICACAO DE EQUIPAMENTOS	25 090	251	3	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	1	0	100
FENWICK-LINDE OPERATIONS	350 603	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	100
KUKA AG	3 738 827	14128	2	0	0	1	0	0	1	1	1	0	0	1	0	1	1	0	0	1	0	0	41
MECALUX, SA	1 186 316	4574	2	0	0	1	1	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0	20
MECALUX SP. Z O.O.	172 539	706	2	0	0	1	1	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0	20
MECALUX SERVIS SA	40 369	85	2	0	0	1	1	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0	20
MECALUX LEVANTE SA	29 272	51	2	0	0	1	1	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0	20
MURATA MACHINERY,LTD.	3 201 193	7700	3	1	0	1	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	0	30
AGVE AB	12 595	43	3	0	0	1	1	0	0	1	0	0	1	0	1	0	1	0	1	0	1	0	6
KONECRANES OYJ	3 620 923	16573	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	1	1	0	0	1	49
SWISSLOG TECHNOLOGY CENTER SWEDEN AB	69 744	216	3	0	1	1	1	0	1	0	0	0	1	1	0	1	0	0	1	0	1	0	29
SWISSLOG ITALIA S.R.L.	45 797	95	3	0	1	1	1	0	1	0	0	0	1	1	0	1	0	0	1	0	1	0	29
SWISSLOG (Belgium)	13 979	24	3	0	1	1	1	0	1	0	0	0	1	1	0	1	0	0	1	0	1	0	29
SCOTT AUTOMATION (Belgium)	35 730	87	3	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	0	12
SCOTT AUTOMATION GMBH	4 430	9	3	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	0	12
UNIVERSAL ROBOTS A/S (Denmark)	296 192	672	2	0	0	1	0	0	0	1	0	0	1	0	0	1	1	0	0	1	0	0	14
UNIVERSAL ROBOTS SPAIN SL.	3 857	22	2	0	0	1	0	0	0	1	0	0	1	0	0	1	1	0	0	1	0	0	14
GEBHARDT INTRALOGISTICS GROUP GMBH & CO. KG	161 249	500	3	0	0	1	0	0	1	0	0	1	1	1	0	1	1	0	1	0	0	0	11
I.A.C. CONVEYOR SYSTEMS LIMITED	35 530	89	2	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	0	2
PYROBAN LIMITED	17 760	123	1	1	0	0	1	0	0	0	0	1	0	1	0	0	0	1	1	1	0	0	30
LOGISTEX EUROPE LTD (UK)	38 096	261	1	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	1	0	1
JOHN BEAN TECHNOLOGIES FOODTECH SPAIN SL.	13 143	124	3	0	0	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	25
FORTNA	3 143	15	2	0	0	0	1	0	1	1	0	1	1	1	0	1	1	0	1	0	1	0	10
FERAG BELGIUM	2 614	4	3	0	0	1	1	0	1	0	0	1	1	0	0	1	1	0	1	0	1	0	50
FERAG NORDIC OY	2 006	3	3	0	0	1	1	0	1	0	0	1	1	0	0	1	1	0	1	0	1	0	50
TRASCAR S.P.A.	33 363	64	2	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	1
KARDEX FINLAND OY	5 715	12	3	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	30
KARDEX SYSTEMS (UK) LIMITED	15 840	68	3	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	30

Appendix 20 - List of Imeguisa's competitors in Portugal (red) and abroad (grey) and characteristics



Appendix 21 - Silhouette Method for the optimal number of clusters in the analysis of competitors Portugal



Appendix 22 - Silhouette Method for the optimal number of clusters in the analysis of Global competitors

Cluster Id	Operating revenue	Net income	No. Employees	Product Affinity	Aerospace / Aeronautics	Agriculture	Automotive	Chemical / Pharma	Constr / Mechanical Eng	E-commerce	Electronics	Energy	Fashion/Apparel/Textile	Food & Beverages	(FMCG	Furniture	Health & Wellness	Manufacturing / Industry	Mining	Logistics & Warehousing	Plastics	Retail / Wholesale	Transport	Global presence
1	0,666544833	-1,01296449	1,171730555	0,455183239	-0,603022689	-0,3922323	0,5	1,224744871	0,353553391	2	0,06681531	0,52764485	-0,267261242	1,069044968	2,54950976	1,6583124	0,527644853	0,5	0,52764485	-0,204124145	-0,3922323	1,069044968	1,41421356	-0,172098043
2	-0,676972594	-0,28441106	-0,387448065	-0,165521178	-0,27997482	0,02801659	0,14285714	-0,816496581	-0,404061018	-0,14285714	-0,07636035	0,04307305	-0,267261242	-0,649063016	-0,3922323	0,04307305	-0,27997482	0,142857143	-0,27997482	0,233284737	-0,3922323	-0,649063016	-0,40406102	-0,244408145
3	0,906118705	0,18354038	-0,388751726	-1,406930011	1,658312395	1,07863874	-2	-0,816496581	1,414213562	-0,5	0,06681531	0,52764485	-0,267261242	-0,935414347	-0,3922323	-0,60302269	-0,603022689	0,5	1,6583124	-1,224744871	-0,3922323	-0,935414347	0,35355339	1,59499461
4	0,398370271	0,91243141	0,2865447	0,765535447	-0,037688918	-0,3922323	0,5	1,224744871	-0,176776695	-0,5	0,06681531	-0,60302269	0,734968415	1,069044968	-0,3922323	-0,60302269	0,527644853	-0,75	-0,60302269	0,306186218	1,07863874	1,069044968	-0,1767767	-0,285986454

Appendix 23 - Analysis of Competitors in Portugal: Variables' centroids per cluster

Cluster Membership List_Competition Landscape in Portugal	
Company	
KARDEX PORTUGAL, UNIPESSOAL LDA	1
KORBER SUPPLY CHAIN PT, S.A.	1
4ITEC LUSITANIA, S.A.	2
4LEAN, LDA	2
FOLLOW INSPIRATION, S.A.	2
GUEMBA ENGINEERS - CONSULTORIA E ENGENHARIA INDUSTRIAL, LDA	2
I.F.M. ELECTRONIC - SUCURSAL EM PORTUGAL	2
IMEGUISA PORTUGAL - INDUSTRIAS METALICAS REUNIDAS, S.A.	2
LINDE - MATERIAL HANDLING IBERICA, S.A. - SUCURSAL EM PORTUGAL	2
LIEBHERR PORTUGAL, LDA	3
MANITOU PORTUGAL, S.A.	3
BUROTICA - SOCIEDADE DE ESTUDOS E EQUIPAMENTOS AUTOMATICOS DE ESCRITORIO, S.A.	4
EPL - SOLUCOES INDUSTRIAIS, LDA	4
JUNGHEINRICH (PORTUGAL) - EQUIPAMENTOS DE TRANSPORTE, LDA	4
STILL, S.A.U - SUCURSAL EM PORTUGAL	4
15	

Appendix 24 - Analysis of Competitors in Portugal: Cluster Membership List

Cluster Id	Operating revenue	Net Income	No. Employees	Product Affinity	Aerospace / Aeronautics	Agriculture	Automotive	Chemical / Pharma
1	2,459793532	2,970814814	2,135126051	0,902828973	0,943370071	0,743160536	0,5976143	-0,281091348
2	-0,412438902	-0,231502585	-0,384505926	0,157013734	-0,292770022	-0,34299717	0,14342743	0,15284342
3	-0,525595996	-0,34865222	-0,466510346	0,902828973	-0,292770022	-0,34299717	0,5976143	1,054092553
4	0,29297643	-0,340805758	0,283331503	-1,228071708	0,766778629	-0,34299717	-1,34890066	-0,662572462
5	-0,501541734	-0,343267644	-0,451936301	0,902828973	-0,292770022	2,915475947	0,5976143	1,054092553
6	0,457993206	-0,056549523	0,530083148	-0,588801504	-0,292770022	-0,34299717	0,5976143	-0,948683298

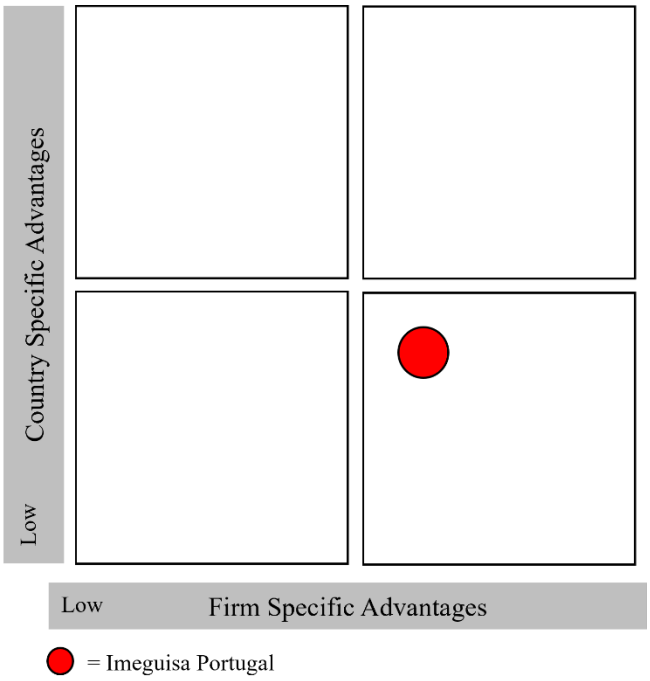
Cluster Id	Constr/Mechanical Eng	E-commerce	Electronics	Energy	Fashion/Apparel/Textile	F&B	(FM)CG	Furniture
1	-0,389249472	0,159363815	-0,01849	0,48113	0,384678399	-0,22696097	-0,5976	-0,343
2	-0,241334673	-0,256974151	-0,088752	-0,433	0,298691463	0,439478967	-0,1434	-0,0171
3	2,569046516	1,673320053	1,38675049	2,3094	-0,475190963	0,557086015	1,67332	2,91548
4	0,455977953	-0,597614305	-0,4199873	0,35053	-0,475190963	-1,4590548	-0,5976	-0,343
5	-0,389249472	1,673320053	-0,7211103	-0,433	-0,475190963	0,557086015	1,67332	-0,343
6	-0,389249472	0,159363815	1,38675049	0,48113	-0,475190963	-0,22696097	0,15936	-0,343

Cluster Id	Health & Wellness	Manufacturing	Mining	Logistics & Warehousing	Plastics	Retail / Wholesale	Transport	Global presence
1	-0,899735411	0,34299717	0,38468	0,389249472	-0,343	0,386500603	-0,51639778	0,235016303
2	0,005292561	0,180073514	-0,3462	0,241334673	-0,1801	0,355121005	-0,39575331	-0,37362959
3	1,11143786	0,34299717	2,10442	0,389249472	-0,343	-0,948683298	1,95649167	0,120525674
4	-0,899735411	0,34299717	0,63036	-0,03336424	-0,343	-0,948683298	1,35566612	0,995197709
5	1,11143786	-2,915475947	-0,4752	0,389249472	-0,343	1,054092553	-0,51639778	0,072315404
6	1,11143786	0,34299717	-0,4752	-2,569046516	2,91548	-0,948683298	-0,51639778	-0,216946213

Appendix 25 - Analysis of Competitors Abroad: Variables’ centroids per cluster

Cluster Membership List_Global Competition Landscape	
Company	
JUNGHEINRICH AG	1
DAIFUKU CO., LTD.	1
MURATA MACHINERY,LTD.	1
IMEGUISA PORTUGAL - INDUSTRIAS METALICAS REUNIDAS, S.A.	2
STILL S.P.A.	2
TOYOTA MATERIAL HANDLING EUROPE LOGISTICS AB	2
CGT LOGISTICA SISTEMI S.P.A. IN FORMA ABBREVIATA CLS S.P.A.	2
DEMATIC LOGISTICS GMBH	2
JBT AEROTECH UK LIMITED	2
JUNGHEINRICH UK LIMITED	2
MECALUX, SA	2
MECALUX SP. Z O.O.	2
MECALUX SERVIS SA	2
MECALUX LEVANTE SA	2
AGVE AB	2
SCOTT AUTOMATION (Belgium)	2
GEBHARDT INTRALOGISTICS GROUP GMBH & CO. KG	2
L.A.C. CONVEYOR SYSTEMS LIMITED	2
LOGISTEX EUROPE LTD (UK)	2
JOHN BEAN TECHNOLOGIES FOODTECH SPAIN SL.	2
FERAG BELGIUM	2
FERAG NORDIC OY	2
TRASCAR S.P.A.	2
KARDEX FINLAND OY	3
KARDEX SYSTEMS (UK) LIMITED	3
LIEBHERR IBERICA, S.L.	4
HYSTER-YALE MATERIALS HANDLING, INC.	4
HYSTER-YALE NEDERLAND B.V.	4
CROWN GABELSTAPLER GMBH & CO. KG	4
FENWICK-LINDE OPERATIONS	4
KONECRANES OYJ	4
PYROBAN LIMITED	4
SWISSLOG TECHNOLOGY CENTER SWEDEN AB	5
SWISSLOG ITALIA S.R.L.	5
SWISSLOG (Belgium)	5
KUKA AG	6
UNIVERSAL ROBOTS A/S (Denmark)	6
UNIVERSAL ROBOTS SPAIN SL.	6
38	

Appendix 26 - Analysis of Competitors Abroad: Cluster Membership List



Appendix 27 - CSA/ FSA Matrix

Manufacturing, Value Added

The total estimate of net-output of all resident manufacturing activity units of a given economy obtained by adding up outputs and subtracting intermediate consumption (UNIDO).

Manufacturing, Value Added (% Of GDP)

The net output of the Manufacturing sector (industries belonging to ISIC divisions 15 to 37) after adding up all outputs and subtracting intermediate inputs. This value added is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources (World Bank).

Medium And High-Tech Manufacturing, Value Added (% Of Manufacturing)

The percentage of Medium and High-Tech industry value added in total value added of Manufacturing. The indicator is calculated as the share of the sum of the value added from medium and high-tech industry economic activities, defined in accordance with OECD classification, to manufacturing value added (World Bank).

GDP Growth (Annual %)

Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

Manufacturing, Value Added Growth (Annual %)

Annual growth rate for manufacturing value added based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. Manufacturing refers to industries belonging to ISIC divisions 10-33. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 4.

5-Year CAGR Manufacturing, Value Added

The Compound Annual Growth Rate of a country's Manufacturing sector with a timeframe of five years.

Imports of goods and services (% of GDP)

Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as

communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.

Cost to import, border compliance

Border compliance captures the time and cost associated with compliance with the economy's customs regulations and with regulations relating to other inspections that are mandatory in order for the shipment to cross the economy's border, as well as the time and cost for handling that takes place at its port or border. The time and cost for this segment include time and cost for customs clearance and inspection procedures conducted by other government agencies.

Total imports of Intralogistics Products

Sum of the gross imports of Machinery and Mechanical Appliances – Industrial Robots, Lifting and handling machinery, fork-lift and work trucks, transports equipment of the given country.

Import of Intralogistics Products (% Total Imports)

Total imports of Intralogistics Products divided by the total imports of the given country.

Frontier Technology Readiness Index

It includes technological capacities related to physical investment, human capital and technological effort, and covers national capacities to use, adopt and adapt 11 frontier technologies ((artificial intelligence (AI), the Internet of things (IoT), big data, blockchain, 5G, 3D printing, robotics, drones, gene editing, nanotechnology and solar photovoltaic (Solar PV)). The following five categories were selected for the index to measure the aforementioned capacities: ICT deployment, skills, R&D activity, industry activity and access to finance. An index value closer to 1 indicates that a country is ready for the use and adoption of frontier technologies, whereas an index value closer to 0 indicates it is less ready. (UNCTAD)

Quality Of Overall Infrastructure

Global country ranking by quality of infrastructure based on questionnaires assessing business professionals' perceptions on their country's infrastructure conditions. The data source is the World Economic Forum's Global Competitiveness Index 2017-2018.

Logistics Performance Index

Logistics Performance Index overall score reflects perceptions of a country's logistics based on efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time. The index ranges from 1 to 5, with a higher score representing better performance.

Container port traffic (TEU: 20 foot equivalent units)

Port container traffic measures the flow of containers from land to sea transport modes, and vice versa, in twenty-foot equivalent units (TEUs), a standard-size container. Data refer to coastal shipping as well as international journeys. Transhipment traffic is counted as two lifts at the intermediate port (once to off-load and again as an outbound lift) and includes empty units.

Electricity average price of 1KW/h (USD)

The average cost of a kilowatt hour (KWh) presented for each individual country is the median of a range composed of all available tariffs, up to and including a maximum of 60 individual energy tariffs for any one location

Petrol Prices per Litre

Gasoline prices, Octane-95.

Cost to export, border and documentary compliance

Sum of cost to export, border and documentary compliance. Border compliance captures the time and cost associated with compliance with the economy's customs regulations and with regulations relating to other inspections that are mandatory in order for the shipment to cross the economy's border, as well as the time and cost for handling that takes place at its port or border. Documentary compliance captures the time and cost associated with compliance with the documentary requirements of all government agencies of the origin economy, the destination economy and any transit economies.

Political Risk Rating

Rating which classifies countries into seven categories (from 1 to 7), reflecting the intensity of risks coming about as a result of political and assimilated events. Category 1 includes countries where political risk is considered the lowest, and category 7 contains those countries where the likelihood of risks arising from political and assimilated events is deemed highest. Such risks include foreign exchange shortage, political unrest, revolution or riot, natural disaster and arbitrary government action.

Inflation, GDP deflator (annual %)

Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.

Corruption Perceptions Index

Ranking of 180 countries and territories by their perceived levels of public sector corruption. The results are given on a scale of 0 (highly corrupt) to 100 (very clean).

Index Of Economic Freedom

Rating of 184 economies according to their degree of freedom and openness. Four categories are taken into account: Rule of Law, Government Size, Regulatory Efficiency, and Open Markets.

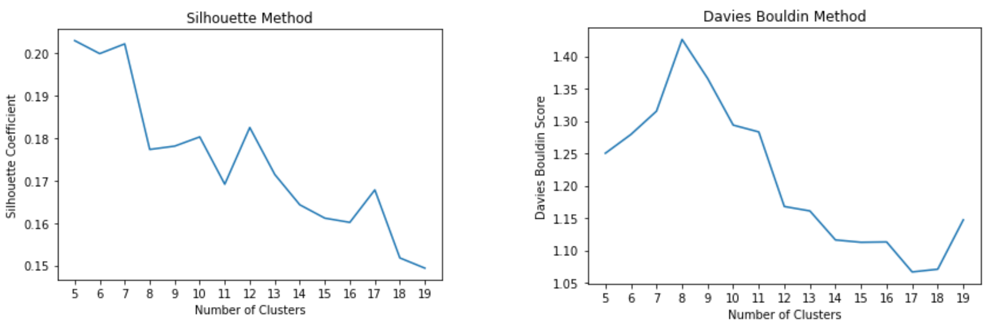
Getting Credit
This topic covered two aspects of access to finance—the strength of credit reporting systems and the effectiveness of collateral and bankruptcy laws in facilitating lending.
Protecting Minority Investors
This topic measured the strength of minority shareholder protections against misuse of corporate assets by directors for their personal gain as well as shareholder rights, governance safeguards and corporate transparency requirements that reduce the risk of abuse.
Paying taxes
This topic recorded the taxes and mandatory contributions that a medium-size company must have paid or withheld in a given year, as well as the administrative burden of paying taxes and contributions.
Trading across borders
The time and cost associated with the logistical process of exporting and importing goods. Doing Business measured the time and cost (excluding tariffs) associated with three sets of procedures—documentary compliance, border compliance and domestic transport—within the overall process of exporting or importing a shipment of goods.
Enforcing contracts
The enforcing contracts indicator measured the time and cost for resolving a commercial dispute through a local first-instance court, and the quality of judicial processes index, evaluating whether each economy had adopted a series of good practices that promote quality and efficiency in the court system.
Resolving insolvency
Doing Business studied the time, cost and outcome of insolvency proceedings involving domestic legal entities. These variables were used to calculate the recovery rate, which was recorded as cents on the dollar recovered by secured creditors through reorganisation, liquidation or debt enforcement (foreclosure or receivership) proceedings.
Environmental Performance Index
Ranking of 180 countries on the basis of their environmental performance using the most recent data available.
CO2 Emissions
Carbon dioxide emissions by country. Such emissions stem from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during the consumption of solid, liquid, and gas fuels and gas flaring. Data for carbon dioxide emissions includes gases from the burning of fossil fuels and cement manufacture but excludes emissions from land use such as deforestation. (World Bank)
Cultural Distance To Portugal
Numerical assessment of the affinity degree between Portugal and the countries under consideration. Such assessment is performed on the basis of six cultural dimensions – Power Distance, Individualism, Masculinity, Uncertainty Avoidance, Long Term Orientation, and Indulgence – as quantified by Hofstede's standards. The higher the value, the larger the distance between Portugal and a given country regarding the overall cultural profile of each one.

Appendix 28 - Definitions of Variables

	Manufacturing_VA	MediumHighManu	Manufacturing_GDP	GDP_growth	AnnualGrowth_Manufacturing	5CAGR_Manufacturing	Imports of goods and services (% of GDP)	Cost to import, border compliance (US$)	Total imports of Intralogistic Products	Intralogistic Products(% Imports)
Manufacturing_VA	1	0,227829	0,258150	0,044753	-0,896715	0,073863	-0,227790	-0,099121	0,653780	-0,130435
MediumHighManu	0,227829	1	0,352920	0,014815	-0,078619	0,130540	0,155075	-0,300218	0,421422	-0,285848
Manufacturing_GDP	0,258150	0,352920	1	-0,097948	-0,115636	0,320288	-0,127615	-0,184517	0,113632	-0,373258
GDP_growth	0,044753	0,014815	-0,097948	1	-0,013871	0,107961	0,087738	-0,106641	0,005529	-0,070796
AnnualGrowth_Manufacturing	-0,896715	-0,078619	-0,115636	-0,013871	1	0,023082	0,173734	-0,046382	-0,396626	0,088318
5CAGR_Manufacturing	0,073863	0,130540	0,320288	0,107961	0,023082	1	0,225606	-0,464090	0,052142	-0,234154
Imports of goods and services (% of GDP)	-0,227790	0,155075	-0,127615	0,087738	0,173734	0,225606	1	-0,285828	-0,203589	0,210141
Cost to import, border compliance (US$)	-0,099121	-0,300218	-0,184517	-0,106641	-0,046382	-0,464090	-0,285828	1	-0,333136	0,200850
Total imports of Intralogistic Products	0,653780	0,421422	0,113632	0,005529	-0,396626	0,052142	-0,203589	-0,333136	1	-0,072337
Intralogistic Products(% Imports)	-0,130435	-0,285848	-0,373258	-0,070796	0,088318	-0,234154	0,210141	0,200850	-0,072337	1
FTR	0,287118	0,693806	0,085685	0,039147	-0,110928	0,201833	0,243086	-0,444041	0,544510	-0,082480
QOI	0,168477	0,517833	0,017368	0,106290	-0,075515	0,172602	0,273151	-0,548742	0,317548	-0,183809
Container port traffIC 20	0,905391	0,212646	0,254479	0,078188	-0,891339	0,084728	-0,047423	-0,086387	0,444229	-0,076235
LogisticsPI	0,278224	0,701038	0,078548	0,085587	-0,119522	0,136516	0,145943	-0,426151	0,546345	-0,156682
ElectricityPrice	-0,004861	0,218387	-0,211852	0,059809	0,006698	-0,051991	0,225225	0,020434	0,204551	0,300679
PetrolPricess	-0,035249	0,213308	-0,209425	0,189163	0,066683	0,211092	0,387069	-0,335551	0,121583	0,102833
Cost to export	-0,057978	-0,391249	-0,181896	-0,232292	-0,054279	-0,493973	-0,322903	0,635010	-0,132750	0,177937
Politica_risk	-0,216225	-0,582427	-0,106296	-0,124940	0,089865	-0,140241	-0,212485	0,424763	-0,420506	0,097163
Inflation_GdpDeflator	-0,070374	-0,097051	0,015317	-0,365224	0,061043	-0,244712	-0,144469	0,248694	-0,128244	-0,073831
CPI	0,060929	0,417974	-0,225030	0,005900	-0,022719	-0,036045	0,308518	-0,270834	0,273344	0,063179
IEF	-0,086768	0,377420	-0,182289	0,171342	0,141749	0,193815	0,462731	-0,311835	0,164402	0,077138
GettingCredit	0,116896	0,157014	0,068392	0,216207	0,019741	0,347450	-0,071574	-0,223602	0,222564	-0,253756
ProtectingMinorityInvestors	0,124593	0,296471	0,087283	0,263303	-0,043450	0,253685	0,117272	-0,282075	0,192957	-0,190784
PayingTaxes	0,003119	0,363859	-0,108128	0,022018	-0,009900	0,195314	0,389629	-0,347341	0,087333	-0,117186
TradingAcrossBorders	0,096992	0,404902	0,067958	0,269305	0,040643	0,492707	0,384158	-0,727486	0,249886	-0,113901
Enforcing contracts	0,223503	0,321823	0,018458	0,134388	-0,183736	0,164012	0,231625	-0,496118	0,251507	-0,107016
ResolvingInsolvency	0,222107	0,485383	0,083764	0,103322	-0,065376	0,182466	0,048249	-0,334531	0,459697	-0,117269
EPI	-0,101709	0,291504	-0,220340	0,120706	0,091024	0,125338	0,426107	-0,305092	0,125860	0,079343
CO2_emissions	0,125171	0,377994	-0,091205	-0,136802	-0,128025	-0,071803	0,079184	-0,013280	0,171948	-0,162215
CulturalDistance_PT	0,266565	0,423611	0,092074	-0,087347	-0,079349	0,170719	0,227265	-0,310383	0,336786	-0,041998

FTR	QOI	Container port traffIC 20	LogisticsPI	ElectricityPrice	PetrolPricess	Cost to export	Politica_risk	Inflation_GdpDeflator	CPI	IEF	GettingCredit	ProtectingMinorityInvestors	PayingTaxes	TradingAcrossBorders	Enforcing contracts	ResolvingInsolvency	EPI	CO2_emissions	CulturalDistance_PT
0,287118	0,168477	0,905391	0,278224	-0,004861	-0,035249	-0,057978	-0,216225	-0,070374	0,060929	-0,086768	0,116896	0,124593	0,003119	0,096992	0,223503	0,222107	-0,101709	0,125171	0,266565
0,693806	0,517833	0,212646	0,701038	0,218387	0,213308	-0,391249	-0,582427	-0,097051	0,417974	0,377420	0,157014	0,296471	0,363859	0,404902	0,321823	0,485383	0,291504	0,377994	0,423611
0,085685	0,017368	0,254479	0,078548	-0,211852	-0,209425	-0,181896	-0,106296	0,015317	-0,225030	-0,182289	0,068392	0,087283	-0,108128	0,067958	0,018458	0,083764	-0,220340	-0,091205	0,092074
0,039147	0,106290	0,078188	0,085587	0,059809	0,189163	-0,232292	-0,124940	-0,365224	0,005900	0,171342	0,216207	0,263303	0,022018	0,269305	0,134388	0,103322	0,120706	-0,136802	-0,087347
-0,110928	-0,075515	-0,891339	-0,119522	0,006698	0,066683	-0,054279	0,089865	0,061043	-0,022719	0,141749	0,019741	-0,043450	-0,009900	0,040643	-0,183736	-0,065376	0,091024	-0,128025	-0,079349
0,201833	0,172602	0,084728	0,136516	-0,051991	0,211092	-0,493973	-0,140241	-0,244712	-0,036045	0,193815	0,347450	0,253685	0,195314	0,492707	0,164012	0,182466	0,125338	-0,071803	0,170719
0,243086	0,273151	-0,047423	0,145943	0,225225	0,387069	-0,322903	-0,212485	-0,144469	0,308518	0,462731	-0,071574	0,117272	0,389629	0,384158	0,231625	0,048249	0,426107	0,079184	0,227265
-0,444041	-0,548742	-0,086387	-0,426151	0,020434	-0,335551	0,635010	0,424763	0,248694	-0,270834	-0,311835	-0,223602	-0,282075	-0,347341	-0,727486	-0,496118	-0,334531	-0,305092	-0,013280	-0,310383
0,544510	0,317548	0,444229	0,546345	0,204551	0,121583	-0,132750	-0,420506	-0,128244	0,273344	0,164402	0,222564	0,192957	0,087333	0,249886	0,251507	0,459697	0,125860	0,171948	0,336786
-0,082480	-0,183809	-0,076235	-0,156682	0,300679	0,102833	0,177937	0,097163	-0,073831	0,063179	0,077138	-0,253756	-0,190784	-0,117186	-0,113901	-0,107016	-0,117269	0,079343	-0,162215	-0,041998
1	0,647027	0,250201	0,870284	0,391982	0,548310	-0,412531	-0,771956	-0,204872	0,727246	0,666387	0,241894	0,454267	0,498238	0,596412	0,506384	0,701065	0,614493	0,300309	0,539956
0,647027	1	0,166575	0,721602	0,176395	0,337688	-0,468824	-0,570860	-0,276304	0,626236	0,562461	0,163088	0,368810	0,571961	0,515745	0,515263	0,504244	0,410388	0,400688	0,423552
0,250201	0,166575	1	0,271134	-0,032059	-0,008713	-0,053954	-0,209888	-0,067652	0,045496	-0,082593	0,057623	0,163984	-0,004343	0,094696	0,248547	0,130063	-0,140643	0,126981	0,244935
0,870284	0,721602	0,271134	1	0,349060	0,471454	-0,415795	-0,757384	-0,179500	0,704408	0,604748	0,211774	0,395410	0,445941	0,545500	0,424569	0,660684	0,527883	0,358042	0,525027
0,391982	0,176395	-0,032059	0,349060	1	0,597302	0,018853	-0,402627	-0,362304	0,598265	0,552662	-0,102856	-0,078975	0,175023	0,209201	-0,005364	0,391197	0,546126	-0,192637	0,266328
0,548310	0,337688	-0,008713	0,471454	0,597302	1	-0,389093	-0,514533	-0,300332	0,611195	0,676359	0,125973	0,197554	0,388746	0,612383	0,253997	0,492727	0,632093	-0,241011	0,351274
-0,412531	-0,468824	-0,053954	-0,415795	0,018853	-0,389093	1	0,315594	0,119631	-0,218226	-0,322745	-0,230869	-0,353611	-0,399574	-0,801260	-0,345820	-0,391744	-0,320702	-0,033338	-0,315859
-0,771956	-0,570860	-0,209888	-0,757384	-0,402627	-0,514533	0,315594	1	0,358421	-0,679930	-0,728903	-0,183576	-0,379650	-0,402407	-0,514131	-0,420743	-0,654216	-0,564861	-0,210709	-0,443950
-0,204872	-0,276304	-0,067652	-0,179500	-0,362304	-0,300332	0,119631	0,358421	1	-0,313841	-0,423322	-0,230380	-0,214825	-0,139515	-0,298829	-0,160113	-0,390509	-0,290336	0,124085	-0,208162
0,727246	0,626236	0,045496	0,704408	0,598265	0,611195	-0,218226	-0,679930	-0,313841	1	0,796592	0,042677	0,189627	0,594618	0,415795	0,397110	0,563872	0,679472	0,259669	0,432629
0,666387	0,562461	-0,082593	0,604748	0,552662	0,676359	-0,322745	-0,728903	-0,423322	0,796592	1	0,310156	0,341515	0,596087	0,547616	0,438546	0,610434	0,687618	0,182347	0,436918
0,241894	0,163088	0,057623	0,211774	-0,102856	0,125973	-0,230869	-0,183576	-0,230380	0,042677	0,310156	1	0,518673	0,183325	0,246879	0,343353	0,312604	0,028040	0,000485	0,350767
0,454267	0,368810	0,163984	0,395410	-0,078975	0,197554	-0,353611	-0,379650	-0,214825	0,189627	0,341515	0,518673	1	0,373545	0,388203	0,435361	0,508218	0,150122	0,108586	0,247550
0,498238	0,571961	-0,004343	0,445941	0,175023	0,388746	-0,399574	-0,402407	-0,139515	0,594618	0,596087	0,183325	0,373545	1	0,461439	0,543670	0,393297	0,361890	0,447414	0,250962
0,596412	0,515745	0,094696	0,545500	0,209201	0,612383	-0,801260	-0,514131	-0,298829	0,415795	0,547616	0,246879	0,388203	0,461439	1	0,494383	0,525839	0,529569	0,026930	0,310356
0,506384	0,515263	0,248547	0,424569	-0,005364	0,253997	-0,345820	-0,420743	-0,160113	0,397110	0,438546	0,343353	0,435361	0,543670	0,494383	1	0,348941	0,299029	0,229290	0,262661
0,701065	0,504244	0,130063	0,660684	0,391197	0,492727	-0,391744	-0,654216	-0,390509	0,563872	0,610434	0,312604	0,508218	0,393297	0,525839	0,348941	1	0,474039	0,132308	0,411102
0,614493	0,410388	-0,140643	0,527883	0,546126	0,632093	-0,320702	-0,564861	-0,290336	0,679472	0,687618	0,028040	0,150122	0,361890	0,529569	0,299029	0,474039	1	0,064247	0,323176
0,300309	0,400688	0,126981	0,358042	-0,192637	-0,241011	-0,033338	-0,210709	0,124085	0,259669	0,182347	0,000485	0,108586	0,447414	0,026930	0,229290	0,132308	0,064247	1	0,081729
0,539956	0,423552	0,244935	0,525027	0,266328	0,351274	-0,315859	-0,443950	-0,208162	0,432629	0,436918	0,350767	0,247550	0,250962	0,310356	0,262661	0,411102	0,323176	0,081729	1

Appendix 29 - Correlation Table



Appendix 30 - Silhouette Method and Davies Bouldin Method

Cluster Membership	Manufacturing_VA	5CAGR_Manufacturing	Cost to export	PetrolPricess	FTR	LogisticsPI	Politica_risk	CulturalDistance_PT
1	-0,205388	0,465474	-0,627604	0,833492	0,408146	0,285369	-0,731762	-0,411744
2	-0,229109	-1,296857	0,550300	-1,758563	-0,787525	-0,470809	0,842735	-0,571742
3	-0,060953	0,068209	0,003034	-0,561939	-0,183972	0,046752	-0,203998	-0,196434
4	-0,264085	1,226167	-0,568223	0,184236	-0,662400	-0,767965	0,932725	-0,480042
5	6,441442	0,453453	-0,306222	-0,329920	1,382627	1,164758	-0,942868	1,460540
6	-0,178161	0,166237	-1,451473	1,235270	1,164947	1,222739	-0,978052	1,815748
7	-0,269723	-0,833817	0,723051	-0,008285	-1,019555	-0,926086	0,781162	0,076486
8	0,210107	0,035641	-0,169876	0,754300	1,439975	1,348366	-1,189158	0,828827
9	-0,275406	0,513649	3,946734	-1,030994	-1,423206	-1,908272	0,781162	-2,230401
10	-0,281183	-3,766294	1,832068	0,159202	-1,130119	-1,193165	0,288582	-3,609979
11	-0,201711	0,324445	0,157244	-1,309975	-0,749765	-0,825806	1,164280	-0,378562
12	-0,181183	-1,526216	2,518680	0,001653	-0,463546	-0,648705	0,411727	-0,338483

Appendix 31 - Centroids Table

	Cluster	Rank
Greece	1	42,62602
Croatia	1	48,03472
Bulgaria	1	48,71394
Romania	1	49,40321
Iceland	1	49,09015
Latvia	1	49,03236
Israel	1	50,87031
Lithuania	1	51,59383
Portugal	1	52,49651
Slovenia	1	53,36787
Estonia	1	53,17743
Poland	1	53,77719
Spain	1	54,11209
Czech Republic	1	55,10948
1 Average		50,81465
Algeria	2	35,12403
Argentina	2	38,14637
Iran	2	39,28645
Kuwait	2	39,09551
Qatar	2	39,41243
Tunisia	2	41,27857
Oman	2	41,66905
Colombia	2	42,60173
2 Average		39,57677
Costa Rica	3	42,40112
Panama	3	42,24705
Philippines	3	44,88087
Saudi Arabia	3	46,21898
Chile	3	46,9595
Turkey	3	47,24387
Indonesia	3	48,46659
Mexico	3	48,76641
United Arab Emirates	3	48,67405
Malta	3	49,13505
India	3	50,81892
Thailand	3	52,37203
Malaysia	3	55,47304
3 Average		47,97365

	Cluster	Rank
Jordan	4	41,61746
Ukraine	4	41,81588
Moldova	4	42,2684
Albania	4	42,69029
Montenegro	4	42,55708
Armenia	4	42,64641
Bosnia and Herzegovina	4	42,80231
Morocco	4	44,29373
Georgia	4	44,45488
Vietnam	4	46,85973
North Macedonia	4	46,38446
Serbia	4	46,88947
Cyprus	4	48,34246
4 Average		44,12481
China	5	64,56085
United States	5	66,9691
5 Average		65,76497
Hungary	6	52,04798
Slovakia	6	53,00614
Austria	6	57,6901
Hong Kong	6	55,73657
Denmark	6	57,54232
Netherlands	6	58,16498
Sweden	6	57,89501
6 Average		56,01187
Lebanon	7	32,8256
Belize	7	33,77182
Barbados	7	36,66832
Namibia	7	36,8636
Jamaica	7	37,74003
Dominican Republic	7	38,42145
Sri Lanka	7	38,67295
Seychelles	7	37,65922
Trinidad and Tobago	7	39,5318
Peru	7	40,77656
Mauritius	7	44,9864
7 Average		37,99252

	Cluster	Rank
Australia	8	49,41929
Italy	8	52,95694
United Kingdom	8	53,18814
New Zealand	8	53,49658
Norway	8	53,5846
Canada	8	54,90118
Luxembourg	8	53,75649
Finland	8	55,57082
Belgium	8	55,81616
France	8	57,29088
Switzerland	8	58,21727
Japan	8	59,50455
South Korea	8	59,1075
Ireland	8	59,10349
Germany	8	61,10865
Singapore	8	62,53603
8 Average		56,22241
Gabon	9	27,65278
9 Average		27,65278
Bahamas	10	31,19074
10 Average		31,19074
Suriname	11	34,79096
Fiji	11	37,50085
Ecuador	11	39,11356
Egypt	11	41,32253
Uzbekistan	11	43,26907
Russia	11	43,36238
Bahrain	11	44,25757
Belarus	11	44,21593
Kazakhstan	11	44,59003
11 Average		41,38032
Samoa	12	30,36803
Uruguay	12	37,24107
Brazil	12	40,68608
South Africa	12	41,60047
12 Average		37,47391

Appendix 32 - Country clustering

Category	Variable	Weights
Market Size (14%)	Manufacturing, Value Added	14%
Market Intensity (7%)	Manufacturing, Value Added (% Of GDP)	4%
	Medium And High-Tech Manufacturing, Value Added (% Of Manufacturing)	3%
Market Growth (10%)	GDP Growth (Annual %)	1%
	Manufacturing, Value Added Growth (Annual %)	5%
	5-Year CAGR Manufacturing	4%
Market Receptivity (11%)	Import Of Good and Services (% Of GDP)	3%
	Cost To Import (Border Compliance)	3%
	Total Imports Of Lifting-Handling- Machinery	3%
	Imports Of Lifting-Handling- Machinery (% Of Total Imports)	2%
Technological Readiness (6%)	Frontier Technology Readiness Index	6%
Infrastructure (13%)	Quality Of Overall Infrastructure	5%
	Container Port Traffic	3%
	Logistics Performance Index: Overall	5%
Operating Costs (12%)	Electricity Average Price Of 1KW/H (USD)	3%
	Petrol Prices Per Litre	4%
	Cost To Export (Border And Documentary Compliance)	5%
Country Risk (10%)	Political Risk Rating	4%
	Inflation	1%
	Corruption Perceptions Index	1%
	Index Of Economic Freedom	4%
Doing Business (7%)	Getting Credit	1%
	Protecting Minor Investors	1%
	Paying Taxes	1,5%
	Trading Across Borders	1,5%
	Enforcing Contracts	1%
	Resolving Insolvency	1%
Environmental Governance (3,5%)	Environmental Performance Index	3%
	Co2 Emissions	0,5%
Cultural Distance (6,5%)	Cultural Distance To Portugal	6,5%

Appendix 33 - Categories, variables, and weighting in country ranking

Countries	Rank	Score
United States	1	66,96909649
China	2	64,56084511
Singapore	3	62,53603186
Germany	4	61,10865281
Japan	5	59,50454958
South Korea	6	59,10749995
Ireland	7	59,10349146
Switzerland	8	58,21727269
Netherlands	9	58,16498276
Sweden	10	57,89501406
Austria	11	57,69009757
Denmark	12	57,54231746
France	13	57,29087817
Belgium	14	55,81616451
Hong Kong	15	55,73656901
Finland	16	55,57081645
Malaysia	17	55,47304143
Czech Republic	18	55,10948449
Canada	19	54,90118203
Spain	20	54,11208664
Poland	21	53,77719384
Luxembourg	22	53,7564931
Norway	23	53,58460499
New Zealand	24	53,49658213
Slovenia	25	53,36787082
United Kingdom	26	53,18813519
Estonia	27	53,1774261
Slovakia	28	53,00613754
Italy	29	52,95693846
Portugal	30	52,49650965
Thailand	31	52,37203205
Hungary	32	52,04798038
Lithuania	33	51,59382907
Israel	34	50,87030707

Countries	Rank	Score
India	35	50,81891851
Australia	36	49,41929248
Romania	37	49,40320773
Malta	38	49,13504779
Iceland	39	49,09015441
Latvia	40	49,0323618
Mexico	41	48,76640572
Bulgaria	42	48,71393819
United Arab Emirates	43	48,67404677
Indonesia	44	48,46659407
Cyprus	45	48,34245633
Croatia	46	48,03471567
Turkey	47	47,24386673
Chile	48	46,9594994
Serbia	49	46,88947183
Vietnam	50	46,85972731
North Macedonia	51	46,38446469
Saudi Arabia	52	46,21897786
Mauritius	53	44,98639524
Philippines	54	44,88087121
Kazakhstan	55	44,59003434
Georgia	56	44,45487647
Morocco	57	44,29372544
Bahrain	58	44,25756512
Belarus	59	44,21593079
Russia	60	43,36237814
Uzbekistan	61	43,26907355
Bosnia and Herzegovina	62	42,80231036
Albania	63	42,69028598
Armenia	64	42,64641242
Greece	65	42,62602255
Colombia	66	42,60172578
Montenegro	67	42,55708208
Costa Rica	68	42,40111529
Moldova	69	42,268404

Countries	Rank	Score
Panama	70	42,24705373
Ukraine	71	41,81588133
Oman	72	41,66904604
Jordan	73	41,61746035
South Africa	74	41,60047257
Egypt	75	41,32253386
Tunisia	76	41,27856735
Peru	77	40,77656178
Brazil	78	40,68608091
Trinidad and Tobago	79	39,53179653
Qatar	80	39,4124302
Iran	81	39,28645287
Ecuador	82	39,11356002
Kuwait	83	39,0955063
Sri Lanka	84	38,67294761
Dominican Republic	85	38,42145303
Argentina	86	38,14636994
Jamaica	87	37,74002501
Seychelles	88	37,65922343
Fiji	89	37,50084972
Uruguay	90	37,24107229
Namibia	91	36,86359531
Barbados	92	36,6683238
Algeria	93	35,12402998
Suriname	94	34,79096226
Belize	95	33,77182049
Lebanon	96	32,82560278
Bahamas	97	31,1907409
Samoa	98	30,36803311
Gabon	99	27,65278091

Appendix 34 - Country Ranking

Countries	Rank	Score
United States	1	66,96909649
China	2	64,56084511
Singapore	3	62,53603186
Germany	4	61,10865281
Japan	5	59,50454958
South Korea	6	59,10749995
Ireland	7	59,10349146
Switzerland	8	58,21727269
Netherlands	9	58,16498276
Sweden	10	57,89501406
Austria	11	57,69009757
Denmark	12	57,54231746
France	13	57,29087817
Belgium	14	55,81616451
Hong Kong	15	55,73656901

Appendix 35 - Top 15 country ranking

Countries	Vehicles and Parts Manufacturing		Retail	
	2021 Production Turnover (USD Million)	5Y CAGR Production Turnover (%)	2021 Production Turnover (USD Million)	5Y CAGR Production Turnover (%)
Czech Republic	63 222	-00,3	19 881	03,0
Estonia	455	01,1	2 327	04,1
India	95 282	03,8	193 790	-02,3
Lithuania	509	02,6	5 745	02,7
Malaysia	16 920	04,1	39 504	02,6
Poland	45 705	02,8	59 534	01,2
Slovenia	3 900	01,9	3 868	01,3
Thailand	36 610	03,3	45 249	-00,9
Mexico	171 293	02,4	98 520	-00,5
Turkey	42 386,6	08,5	55 571,1	01,5

Appendix 36 - Market Potential for Vehicles and Parts Manufacturing and Retail Industry.
Source: Passport

Countries	Competitors
Slovenia	7
Estonia	5
Poland	30
Czech Republic	17
Lithuania	4
India	60
Thailand	33
Malaysia	33
Mexico	31
Turkey	12

Appendix 37 - Total Number of Competitors of Storage & Handling; Intelligent Transport Systems; Material Handling Equipment
Source: Marketline

Countries	Geographical Distance (Km)
Slovenia	2933
Estonia	4300
Poland	3211
Czech Republic	2848
Lithuania	3626
India	8430
Thailand	10 677
Malaysia	11508
Mexico	8712
Turkey	4708

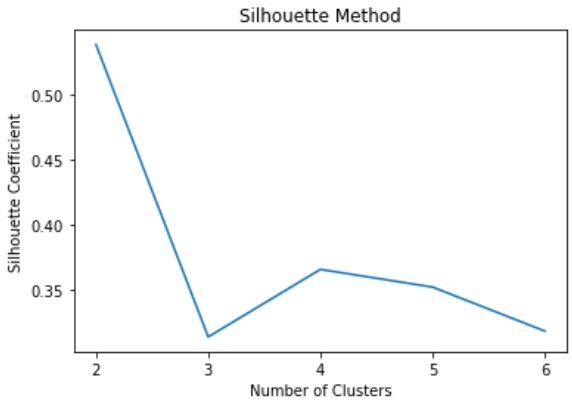
Appendix 38 - Geographical Distance from Portugal to other country (measure from Lisbon to other country's capital).

	Website	Email
Potential Clients		
1. Toyota Peugeot Citroen Automobile Czech, .	http://www.tpca.cz/	nabor@toyotacz.com
2. Mercedes Benz	https://vozy.mercedes-benz.cz/	N/A
3. Fuso	https://www.fuso-trucks.cz/content/eu/czech/cz/index.html	cantercz@daimler.com
4. Eberspaecher	https://www.purem.com/	info@eberspaecher.com
5. Simoldes Group	https://www.simoldes.com/	spcz@simoldes.com
6. Continental Automotive	https://www.continental.com/cs-cz/spolecnost/pro-dodavatele/	N/A
Distributors and Agents		
7. DREAMLand	https://dreamland-plc.cz/	obchod@dreamland-plc.cz
8. AM Tech Robotics	https://www.amtech-robotics.cz/	robotika@amtech.cz
9. Zlinrobotics	https://www.zlinrobotics.com/	info@zlinrobotics.cz
10. S.D. A.	https://s-d-a.sk/index.php/en/	pavol.jezik@s-d-a.sk
11. Auto SAS	https://www.autosas.cz/	autosas@autosas.cz
12. Impulse 4.0	https://www.impulsesupplychain.com/	info@impulsesupplychain.com
Government Agencies		
13. Business and Investment Development Agency	https://www.czechinvest.org/	fdi@czechinvest.org
14. *CzechTrade*	https://www.czechtrade.cz/	radomil.dolezal@czechtrade.cz
15. Czech Chamber of Commerce	https://www.komora.cz/en/	office @ komora.cz
16. *Portuguese Export Credit Agency*	https://www.cosec.pt/en/cosec/	cosec@cosec.pt
Associations and Unions		
17. Association of Forwarding and Logistics	www.sslczech.cz	ssl@sslczech.cz
18. Czech Logistic Association	www.logistika.cz	cla@logistika.cz
19. Automotive Industry Association	https://autosap.cz	autosap@autosap.cz
Banks		
20. Czech National Bank	https://www.cnb.cz/en/	N/A
21. ČESKÁ SPOŘITELNA	https://www.csas.cz/en/korporace	pprazak@csas.cz
Fairs & Events		
22. MSV international Engineering Fair	https://www.bvv.cz/en/msv/	N/A
23. PVA Expo Prague	https://www.pvaexpo.cz/	info@pvaexpo.cz

Appendix 39 - List of Contacts

Company	Operating Revenue	Net Income	Employees	Product Affinity	Automotive-Focused	Industry Range	Global Presence	Product Range	Customation
Jungheinrich (Cr) S.R.O.	119323	5199	300	3	1	3	41	5	0
Kuka Automation Cr .	60,334	-11	155	2	1	5	40	5	0
Kion Supply Chain Solutions Czech, .	90299	4018	134	3	1	4	37	5	1
Staeubli Systems, .	20570	1138	90	2	1	4	26	5	0
Ssi Chaefer .	165443	3805	1257	3	0	2	6	4	0
Toyota Material Handing Cz	78961	3172	271	3	1	2	41	4	1
Kivnon Global Sl.	3027	857	14	3	1	4	5	1	1
Beewatec .	7096	2174	51	2	0	1	1	3	0
Korber Supply Chain Pt, S.A.	33594	-1479	218	2	1	5	32	3	0
Abb .	474747	38605	3031	3	1	3	89	5	1
Serviscontrol .	2 538	446	27	3	0	1	6	1	1
Kvados, A.S.	5 433	119	122	3	0	2	1	3	0
U & Sluno A. S.	8 155	1 019	88	2	0	2	2	2	0

Appendix 40 - Imeguisa's competitors in Czechia (for clustering analysis)



Appendix 41 - Silhouette Method

Company	Cluster ID
Jungheinrich (Cr)	1
Kuka Automation Cr	1
Kion Supply Chain Solutions Czech	1
Staeubli Systems	1
Toyota Material Handing Cz	1
Korber Supply Chain Pt, S.A.	1
Abb	2
Kivnon Global Sl	3
Serviscontrol	3
Imeguisa Portugal - Indústrias Metálicas Reunidas, S.A.	3
Ssi Chaefer	4
Beewatec	4
Kvados, A.S	4
U & Sluno A.S	4

Appendix 42 - Cluster's membership per country

Cluster ID	Operating Revenue	Net Income	Employees	Automotive-Focused	Industry Range	Global presence	Product Range	Customation
1	-0,123	-0,230	-0,278	0,745	0,750	0,521	0,742	-0,192
2	3,286	3,543	3,327	0,745	0,110	2,682	1,067	1,155
3	-0,569	-0,384	-0,497	0,050	-0,402	-0,795	-1,530	1,155
4	-0,210	-0,253	-0,043	-1,342	-0,851	-0,856	-0,232	-0,866

Appendix 43 - Cluster's centroid (Standardized Values)

Countries	Handling and Lifting Equipment (US$ Millions)	Autonomous Mobile Robots (US$ Millions)
Spain	8471,93	64,8
Czechia	1914,66	14,64

Appendix 44 - 2022 AMRs market in Czechia Republic (Analogy)

Countries	Handling and Lifting Equipment (US$ Millions)	Automated Guided Vehicles (US$ Millions)
Spain	8068,50	97,3
Czechia	1797,80	21,68

Appendix 45 - 2021 AGVs market in Czechia Republic (Analogy)

Assumptions
• Handling and Lifting Equipment YoY growth rate (2022) = 6,5%
• During the forecasted period the market share of automotive market is going to remain the same for both 30,91%, for AGVs and AMRs respectively)
• AMR CAGR (2022-2027) = 23,82%
• AVG CAGR (2021- 2027) = 18.9%
• YoY Growth Rate of Imeguisa's Revenues (2021-2027) = 2%
• % Of Total Imeguisa's Revenues (AVGs & AMRs) = 20% (Marta Filipa's input)
• % Market Penetration in Czechia in 2021 =25% Market penetration in Portugal (2021)

Appendix 46 - Assumptions

	2021	2022	2023	2024	2025	2026	2027
Total Market (US$ Millions)							
AMR	N/A	14,64	18,13	22,45	27,80	34,42	42,62
AGV	21,68	25,78	30,65	36,44	43,33	51,52	61,26
Automotive End-User (US$ Millions)							
AMR (30,91%)	N/A	4,53	5,60	6,94	8,59	10,64	13,17
AGV (21,68%)	4,70	5,59	6,65	7,90	9,39	11,17	13,28
Total Potential Sales	N/A	10,12	12,25	14,84	17,99	21,81	26,46

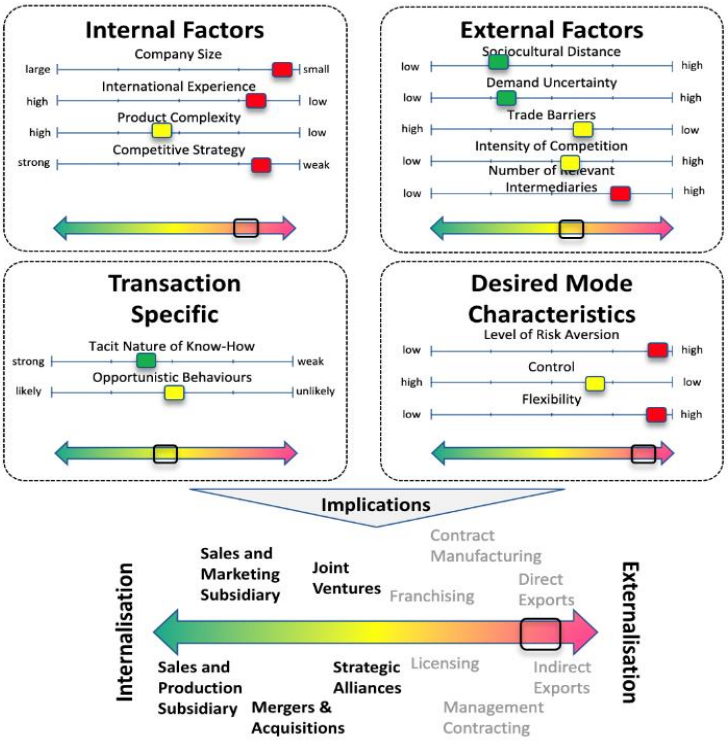
Appendix 47 - Market Potential Sales in Czech Republic for the forecasted period (2022-2027)

	2022	2023	2024	2025	2026	2027
Company Sales Potential in US$	190 955,48	235 875,34	291 480,93	360 342,49	445 655,16	551 392,40

Appendix 48 - Company's Potential Sales in Czech Republic for the forecasted period (2022-2027)

Autonomous Mobile Robots (US$ Millions)	
Total	7,94
Automotive End-User	2,22
Autonomous Guided Vehicles (US$ Millions)	
Total	11,92
Automotive End-User	2,03
Portugal Market Value (AGVs & AMR) (US$ Millions)	
Portugal Market Value (AGVs & AMR)	4,25
Company	
Imeguisa's Revenue (AGVs & AMRs)	1 002 309,50 US$
Imeguisa's market share in Portugal	23,60%
Imeguisa's penetration in Czechia	1,89%

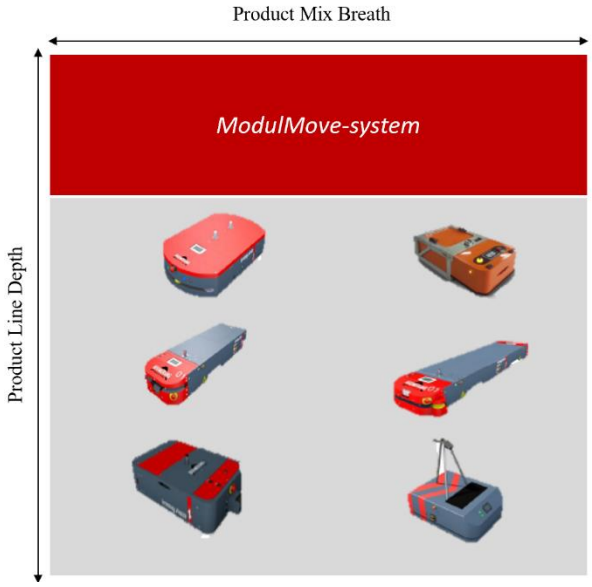
Appendix 49 - Portuguese automotive AMR's and AGVs market (Analogy & Chain Method)



Appendix 50 - Selection Criteria

	Order Size	Price Sensitivity	Long-term relationship	Attractiveness	Strategic Fit	Priority
	25%	25%	50%			
Price Fighters	1	3	1	1,5	2	**2**
Partnership-focused	2	2	3	2,5	3	**1**
Premium Fanatics	3	1	2	2	1	**3**

Appendix 51 - Segmentation & Targeting: Hierarchisation of Customer Segments



Appendix 52 - Imeguisa's Product Mix Breadth

Name	Type	Date	Local
MT TSL	International Transport and Logistics Fair	7-9 February 2023	Warsaw, Poland
EXPO Manufactura	International trade fair for manufacturing industry	7-9 February 2023	Monterrey, Mexico
Mexicali Supply Expo	Logistics	23 February 2023	Baja, Mexico
Intermodal South America	International trade fair for freight transport, logistics and foreign trade	28 Feb. - 2 Mar. 2023	São Paulo, Brazil
Intralogistics Robotics & Automation	Trade fair for materials handling in industry and logistics	28-30 March 2023	Paris, France
Food industry meetings	International B2B convention for the food industry in Mexico	19-20 April 2023	Toluca, Mexico
Logistics & Automation	Trade fair for intralogistics and material flow	24-25 May 2024	Dortmund, Germany

Appendix *53* - Future Industry Fairs

Briefing	Period	Comment
Initial Information		
The life of the Internationalization project is expected not to end. The analysis begins in 2023. From 2027 on, the Cash-Flows will become a perpetuity.		
Inflation rate forecasts for Mexico were taken into account for the computations.		
A currency exchange rate of 1 between USD and EUR (as per October 25, 2022) was assumed for the calculations.		
Imeguisa's AGVs and AMRs have a warranty period of 1 year.		
Revenues		
The values of the AGVs and AMRs corresponded to their gross price, hence, the Value-added tax (VAT) in Portugal was discounted to obtain a net price.	2023-2027	Product prices, VAT
Inflation rates for Mexico respective to the forecasted period were incorporated into the calculation of Imeguisa's estimated AGV and AMR product price in the Mexican Market.	2023-2027	Product prices, Inflation
A default contract duration of 2 years was assumed for all clients in Mexico, unless stated otherwise.	2023-2027	Contract duration

Orders were assumed to be medium-sized and evenly distributed throughout the contract duration with yearly payments corresponding to the equipment the client received that year.	2023-2027	Order size, Order distribution
A discount of 5% of the total value of the contract would be granted to repeat clients.	2023-2027	Discounts
Installation fees were calculated using the values Imeguisa's Product Manager provided regarding Morocco. As they included transportation, accommodation and meal costs and given that the total installation process requires a 10 day period with a team usually consisting of 3 people, the prices for return Lisbon-Marrakech flights, as well as food and accommodation costs for 3 people for a 10-day stay in Morocco were deducted from the 11,000 euro benchmark value. Further, it was assumed that 70% of the costs excluding rent are transportation and food costs.	2023-2027	Installation fees, Transportation , Accommodation & Food costs
The commission paid to the local partner doing the installation of the solutions sold was assumed to be 5% of the selling price of the equipment.	2023-2027	Commission to partners
Preventative maintenance fees equal 15% per year of Imeguisa's total project price with a given client.	2023-2027	Maintenance fees
A basic preventative maintenance plan of 1 year, beginning after the warranty period, was taken as the default option, assuming only three clients would purchase an ‘extra-year plan’.	2023-2027	Preventive Maintenance plans
Repair fees were disregarded as inputs for Imeguisa’s revenue estimation in Mexico, as their value was assumed to be fully discounted and transferred to the local partner(s) providing such services.	2023-2027	Repair fees
A change in the order size will occur due to the growing utilisation of AMRs over AGVs, expected to lead to a cannibalisation of sales.	2024-2027	Order size evolution, Product mix change
Imeguisa's AGVs client base in the Mexican market is assumed to rise by 1 each year.	2023-2027	AGV client base
The AMRs client base is assumed to increase by 2 in the last 3 years of the forecasted period.	2025-2027	AMR client base
COGS		
COGS were calculated as percentage of Sales. Imeguisa has 20% margins, thus for simplicity, was assumed that the COGS were 60% of the Sales Revenues of each year (No adjustments were made during the forecasted period).	2023-2027	COGS, Gross Margin, Net Income
Fixed Costs		
For the logistic fairs cost estimation, it was assumed just 2 people traveling, plus the participation every 2 years, but only as a visitor, for this first phase.	2023-2027	Marketing Expenses, EBITDA, Net Income
Shipping costs represent the costs occurring from transporting the goods to the seaport in Portugal by road, from there the customer organizes further transport	2023-2027	Distribution Expenses, EBITDA, Net Income
Other operating expenses were assumed to be 15% of the sum of the fixed costs (personal, distribution, marketing), representing the overhead costs.	2023-2027	Other operating costs, EBITDA, Net Income
Taxes & Interests		
The Portuguese corporate tax rate is 21%	2023-2027	Taxes, Net Income
No loans were considered, thus, there was no interest expenses.		Interests, Net Income
WACC		

The discount rate was calculated through the WACC method. After calculating the cost of debt and equity, the discount rate (wacc) is 8,18%.	2023-2027	WACC, Net Present Value
It was assumed that the Beta from the Debt (bD) was 0, therefore, the Cost of Debt (Rd) is equal to the Risk-Free (Rf).	2023-2027	Cost of Debt, WACC, Net Present Value
For the calculation of the industry unlevered beta (bU), it was considered the levered beta (bL), of the Engineering/Constructing industry.	2023-2027	Cost of Equity, WACC, Net Present Value
Initial Investments		
Investment in equipment: 50.000€ per year, starting on 2022, as an anticipation to 2023. To be depreciated on a 12,5% rate. Life expectancy is 10 years. Depreciation Values: 6.250€ in 2023; 12.500€ in 2024; 18.750€ in 2025; 25.000€ in 2026; 31.250€ in 2027;	2022-2027	CAPEX, and Depreciation
Because the equipment will still be used after the 5th year, there will be no salvage value.		Salvage Value
Net Working Capital		
No inventory. Imeguisa produces according to orders. "Just-in-Time" approach.		Inventory, Net Working Capital
The accounts receivable was calculated using the historical average weight on Revenues.	2023-2027	Accounts Receivable, Net Working Capital
The accounts payables were calculated using the historical average weight on COGS.	2023-2027	Accounts Payables, Net Working Capital

Appendix 54 – Project Valuation Assumptions

Assumption	
AMR Price with VAT in PT (2022)	60 000,00 €
AGV Price with VAT in PT (2022)	25 000,00 €
VAT PT	23%
AMR Price in Mexico (2022)	48 780,49 €
AGV Price in Mexico (2022)	20 325,20 €
Discount	5,00%
Installation fee per product type (Morocco)	11 000,00 €
Commission paid to the local partner doing the installation of the solutions sold	5%
Maintenance fees (average price of preventive maintenance)	15%
Flights Lisbon-Marrakech for 3 people (Feb dates)	624,00 €
Accomodation Marrakech (Hotel Atlas) 3 people 9 nights (Feb dates)	567,00 €
Single person estimated monthly costs in Marrakech without rent	428,52 €
Food & Transportation costs (3 people; 10 day stay)	299,96 €

Appendix 55 – Revenue Estimation Assumptions

Project Valuation: Imeguisa

INPUTS

Year	2022	2023	2024	2025	2026	2027
Years of operation	0	1	2	3	4	5
Revenues Inputs						
AMR's units per order	0	4	5	5	6	6
AGV's units per order	0	4	3	3	3	3
#Orders from AMR Repeat Clients	0	0	0	0	0	1
#Orders from AMR New Clients	0	1	1	2	2	2
#Orders from AMR 2nd year Contract Client	0	0	1	1	2	2
#Orders from AGV Repeat Clients	0	0	0	0	0	0
#Orders from AGV New Clients	0	1	1	1	1	1
#Orders from AGV 2nd year Contract Client	0	0	1	1	1	1
AMR Price per unit (€)	0	51 853,66 €	53 870,77 €	55 637,73 €	57 356,93 €	59 094,85 €
AGV Price per unit (€)	0	21 605,69 €	22 446,15 €	23 182,39 €	23 898,72 €	24 622,85 €
Instalation fee	0	21 801,11 €	21 306,84 €	65 085,06 €	64 965,33 €	131 391,18 €
Mantainance Fees	0	- €	45 731,71 €	82 317,07 €	133 536,59 €	140 853,66 €
Discount for Repeat Clients (applied on the Price)	0	5%	5%	5%	5%	5%
Costs Inputs						
Transportation/ Shipping costs (288 per shipping)	0	288,00 €	576,00 €	864,00 €	1 152,00 €	1 440,00 €
Personnel Expenses	0	14 658,00 €	37 142,00 €	37 142,00 €	59 626,00 €	95 704,00 €
Website Development expenses	0	4 060 €	216,00 €	216,00 €	2 216,00 €	216,00 €
Marketing expenses	0	2 400,00 €	2 640,00 €	2 880,00 €	3 120,00 €	3 360,00 €
Commissions (95% of installation & repair fee)	0	20 711,05 €	63 686,62 €	140 032,03 €	188 576,82 €	258 632,60 €
Fairs and Events	0	4 114,00 €	- €	4 114,00 €	- €	4 114,00 €
Comissions (% of installation & repair)	95%					
Other Expenses	15,00%					
COGS (% of sales)	60,00%					
Discount Rate	8,18%					
Corporate Tax Rate	21%					
Average Order Value per Client (base rate)	144 357,72 €					
Average Order Value per Client (percentage of base rate)			5%	26%	21%	16%
Inflation Mexico		6%	4%	3%	3%	3%
Inflation Portugal		5%	3%	2%	2%	2%
Investment inputs						
Cost of equipment	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €
Cost of factory	0	0	0	0	0	0
Economic life (years of depreciation)	10					
Annual rate constant shares (%)	12,5%					
Salvage value before taxes	n.a					
Working Capital (% of following year sales)	n.a					
Growth rate (forever) after 2027	3%					

P&L

Year	2022	2023	2024	2025	2026	2027
Number of Orders		2	4	5	6	7
Average Order Value		144 357,72 €	151 697,03 €	191 303,42 €	230 633,96 €	268 152,60 €
Sales Revenues		**288 715,45 €**	**606 788,11 €**	**956 517,12 €**	**1 383 803,74 €**	**1 877 068,20 €**
Instalation fee		21 801,11 €	21 306,84 €	65 085,06 €	64 965,33 €	131 391,18 €
Mantainance Fees		- €	45 731,71 €	82 317,07 €	133 536,59 €	140 853,66 €
Total Revenues		**310 516,55 €**	**673 826,66 €**	**1 103 919,26 €**	**1 582 305,66 €**	**2 149 313,04 €**
Revenues Growth		*n.a*	*117,0%*	*63,8%*	*43,3%*	*36%*
COGS corrected for port_Inflation		170 572,98 €	366 806,30 €	581 634,28 €	843 007,49 €	1 144 168,08 €
Partner Comissions		20 711,05 €	63 686,62 €	140 032,03 €	188 576,82 €	258 632,60 €
Gross profit		**119 232,52 €**	**243 333,73 €**	**382 252,95 €**	**550 721,34 €**	**746 512,36 €**
GP Margin		*38,40%*	*36,11%*	*34,63%*	*34,80%*	*34,73%*
Operating Expenses						
Personnel Expenses		14 658,00 €	37 142,00 €	37 142,00 €	59 626,00 €	95 704,00 €
Distribution expenses		288,00 €	576,00 €	864,00 €	1 152,00 €	1 440,00 €
Marketing Expenses		10 574 €	2 856,00 €	7 210,00 €	5 336,00 €	7 690,00 €
Other operating expenses		3 828,00 €	6 086,10 €	6 782,40 €	9 917,10 €	15 725,10 €
Total Operating Expenses		29 348,00 €	46 660,10 €	51 998,40 €	76 031,10 €	120 559,10 €
EBITDA		**89 884,52 €**	**196 673,63 €**	**330 254,55 €**	**474 690,24 €**	**625 953,26 €**
EBITDA Margin		*28,95%*	*29,19%*	*29,92%*	*30,00%*	*29,12%*
Depreciation (Equipment)		6 250,00 €	12 500,00 €	18 750,00 €	25 000,00 €	31 250,00 €
EBIT		**83 634,52 €**	**184 173,63 €**	**311 504,55 €**	**449 690,24 €**	**594 703,26 €**
Interest Expenses		- €	- €	- €	- €	- €
EBT		**83 634,52 €**	**184 173,63 €**	**311 504,55 €**	**449 690,24 €**	**594 703,26 €**
Taxes Expenses		17 563,25 €	38 676,46 €	65 415,96 €	94 434,95 €	124 887,69 €
Net Income		**66 071,27 €**	**145 497,17 €**	**246 088,60 €**	**355 255,29 €**	**469 815,58 €**
Net Profit Margin		*21,28%*	*21,59%*	*22,29%*	*22,45%*	*21,86%*

Appendix 56 – Projected P&L (2023 – 2027)

CASH Flows

NOPLAT		**66 071**	**145 497**	**246 089**	**355 255**	**469 816**
OPERATING CASH FLOW		**72 321**	**157 997**	**264 839**	**380 255**	**501 066**
CAPEX (Equipment)	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €
Salvage Value (Equipment)	- €	- €	- €	- €	- €	- €
Salvage Value after taxes (Equipment)	- €	- €	- €	- €	- €	- €
Net Working Capital level	- €	- 93 121,01 €	- 222 705,99 €	- 380 485,25 €	- 484 544,77 €	- 542 978,83 €
Inventory	- €	- €	- €	- €	- €	- €
Accounts Payable	- €	39 349,55 €	73 511,34 €	143 488,75 €	235 034,07 €	272 506,81 €
Receivable	- €	134 470,56 €	296 215,33 €	523 974,00 €	719 578,84 €	815 485,64 €
INVESTMENT IN NET WORKING CAPITAL	- €	- **95 121,01 €**	- **127 582,98 €**	- **157 781,27 €**	- **104 059,52 €**	- **58 434,06 €**
INVESTMENT CASH FLOW	- **50 000,00 €**	- **145 121,01 €**	- **177 582,98 €**	- **207 781,27 €**	- **154 059,52 €**	- **108 434,06 €**
FREE CASH FLOW	- **50 000,00 €**	- **72 799,73 €**	- **19 585,81 €**	**57 057,33 €**	**226 195,77 €**	**392 631,52 €**

INVESTMENT DECISION RULES

Net Present Value

Year	2022	2023	2024	2025	2026	2027
Annual Cash Flows	- 50 000,00 €	- 72 799,73 €	- 19 585,81 €	57 057,33 €	226 195,77 €	392 631,52 €
Terminal Value	- €	- €	- €	- €	- €	7 804 778,02 €
Total Cash flows	- **50 000,00 €**	- **72 799,73 €**	- **19 585,81 €**	**57 057,33 €**	**226 195,77 €**	**8 197 409,54 €**

Discount rate	8,2%
NPV	**5 608 540,17 €**
Internal Rate of Return	157,26%
Profitability Index	113,17

Break-Even Point Revenues	71 064,68 €	116 354 €	130 116 €	191 044 €	303 140 €
Break-Even Point (AGV)	**1**	**1**	**1**	**1**	**1**
Break-Even Point (AMR)	**1**	**2**	**2**	**3**	**5**
AGV units	4,00	6,00	6,00	6,00	6,00
AMR units	4,00	10,00	15,00	24,00	30,00
Percentage of sales mix AGV	50%	38%	29%	20%	17%
Percentages of Sales mix AMR	50%	63%	71%	80%	83%
Contribution Margin AGV	8 642,28 €	8 978,46 €	9 272,95 €	9 559,49 €	9 849,14 €
Contribution Margin AMR	20 741,46 €	21 548,31 €	22 255,09 €	22 942,77 €	23 637,94 €
Weighted Average Contribution Margin	14 691,87 €	16 834,61 €	18 545,91 €	20 266,12 €	21 339,81 €
Margin of Safety	75%	81%	86%	86%	84%

Simple Payback Period						
Discounted Cash-Flow	**-50,0**	**-67,3**	**-16,7**	**45,1**	**165,1**	**5 532,4**
Accumulated Discounted Cash-flow	**-50,0**	**-117,3**	**-134,0**	**-89,0**	**76,2**	**5 608,5**
Payback Period	Year 4					

4,01 **4 years 5 days to recover the investment**

Appendix 57 – Projected Cash-Flows and Investment Decision Rules

Sensitivity analysis: one variable

Average Order Value	NPV	5 608,5	var %	IRR	157%
	75 000,00 €	1 307,3	-76,7%	75 000,00 €	69%
	100 000,00 €	2 857,7	-49,0%	100 000,00 €	108%
	144 357,72 €	**5 608,5**	0,0%	**144 357,72 €**	**157%**
	200 000,00 €	9 059,2	61,5%	200 000,00 €	208%
	250 000,00 €	12 160,0	116,8%	250 000,00 €	251%

COGS (% of Sales)	NPV	5 608,5	var %	IRR	157%
	30%	12 587,3	124,4%	30%	254%
	50%	7 934,8	41,5%	50%	192%
	60,0%	**5 608,5**	0,0%	**60,0%**	**157%**
	70%	3 282,3	-41,5%	70%	117%
	80%	956,0	-83,0%	80%	58%

Partner Comission	NPV	5 608,5	var %	IRR	157%
	75%	6 268,2	11,8%	75%	166,3%
	85%	5 938,4	5,9%	85%	161,8%
	95%	**5 608,5**	0,0%	**95%**	**157,3%**
	98%	5 509,6	-1,8%	98%	155,9%
	100%	5 443,6	-2,9%	100%	154,9%

Discount Rate	NPV	5 608,5	var %
	5%	16 249,2	189,6%
	7%	7 572,4	35,0%
	8,2%	**5 610,6**	0,0%
	10%	3 896,0	-30,6%
	15%	1 909,5	-66,0%

Sensitivity analysis: two variables

		COGS (% of Sales)				
NPV	**5 608,5**	30%	35%	**60,00%**	70%	80%
Average Order Value	75 000,00 €	4 933,1	4 328,8	1 307,3	98,7	-1 109,9
	100 000,00 €	7 692,1	6 886,3	2 857,7	1 246,2	-365,2
	144 357,72 €	12 587,3	11 424,2	**5 608,5**	3 282,3	956,0
	200 000,00 €	18 727,9	17 116,5	9 059,2	5 836,3	2 613,4
	250 000,00 €	24 245,9	22 231,6	12 160,0	8 131,3	4 102,7

		Discount Rate				
NPV	**5 608,5**	5%	7%	**8,18%**	10%	15%
Average Order Value	75 000,00 €	4 389,1	1 872,6	1 307,9	818,6	265,3
	100 000,00 €	8 664,1	3 927,1	2 858,8	1 927,8	857,9
	144 357,72 €	16 249,2	7 572,4	**5 610,6**	3 896,0	1 909,5
	200 000,00 €	25 764,0	12 145,1	9 062,4	6 364,9	3 228,5
	250 000,00 €	34 314,0	16 254,0	12 164,2	8 583,5	4 413,8

Appendix 58 – Sensitivity analysis (with 1 and 2 variables)

Scenario Analysis

		Baseline	Optimist	Pessimist	
Likelihood		*55%*	*15%*	*30%*	
Changing Cells:					
	Total Orders (2023)	2	2	1	
	Total Orders (2024)	4	4	1	
	Total Orders (2025)	5	6	1	
	Total Orders (2026)	6	8	1	
	Total Orders (2027)	7	10	1	
	COGS (% revenues)	60,00%	55,00%	65,00%	
	Partner Comissions	95%	90%	96%	
Result Cells:					
	NPV	5 608 540,17 €	11 058 149,41 €	- 2 203 699,23 €	**4 082 309,74 €**
	IRR	157,26%	206,99%	n.a	**n.a**
	ProfitabilityIndex	113,17	222,16	-43,07	**82,65**

Appendix 59 – Scenario Analysis

OPTIMISTIC

INPUTS

Year	2022	2023	2024	2025	2026	2027
Years of operation	0	1	2	3	4	5
Revenues Inputs						
AMR's units per order	0	4	5	5	6	6
AGV's units per order	0	4	3	3	3	3
#Orders from AMR Repeat Clients	0	0	0	0	0	2
#Orders from AMR New Clients	0	1	1	3	3	3
#Orders from AMR 2nd year Contract Client	0	0	1	1	3	3
#Orders from AGV Repeat Clients	0	0	0	0	0	0
#Orders from AGV New Clients	0	1	1	1	1	1
#Orders from AGV 2nd year Contract Client	0	0	1	1	1	1
AMR Price per unit (€)	0	51 853,66 €	53 870,77 €	55 637,73 €	57 356,93 €	59 094,85 €
AGV Price per unit (€)	0	21 605,69 €	22 446,15 €	23 182,39 €	23 898,72 €	24 622,85 €
Instalation fee	0	21 801,11 €	21 306,84 €	65 085,06 €	64 965,33 €	131 391,18 €
Mantainance Fees	0	- €	45 731,71 €	82 317,07 €	133 536,59 €	140 853,66 €
Discount for Repeat Clients (applied on the Price)	0	5%	5%	5%	5%	5%
Costs Inputs						
Transportation/ Shipping costs (288 per shipping)	0	288,00 €	576,00 €	864,00 €	1 152,00 €	1 440,00 €
Personnel Expenses	0	14 658,00 €	37 142,00 €	37 142,00 €	59 626,00 €	95 704,00 €
Website Development expenses	0	4 060 €	216,00 €	216,00 €	2 216,00 €	216,00 €
Marketing expenses	0	2 400,00 €	2 640,00 €	2 880,00 €	3 120,00 €	3 360,00 €
Commissions (95% of installation & repair fee)	0	20 711,05 €	63 686,62 €	140 032,03 €	188 576,82 €	258 632,60 €
Fairs and Events	0	4 114,00 €	- €	4 114,00 €	- €	4 114,00 €
Comissions (% of installation & repair)	90%					
Other Expenses	15,00%					
COGS (% of sales)	55,00%					
Discount Rate	8,18%					
Corporate Tax Rate	21%					
Average Order Value per Client (base rate)	144 357,72 €					
Average Order Value per Client (percentage of			14%	16%	31%	7%
Inflation Mexico		6%	4%	3%	3%	3%
Inflation Portugal		5%	3%	2%	2%	2%
Investment inputs						
Cost of equipment	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €
Cost of factory	0	0	0	0	0	0
Economic life (years of depreciation)	10					
Annual rate constant shares (%)	12,5%					
Salvage value before taxes	n.a					
Working Capital (% of following year sales)	n.a					
	3%					

P&L

Year	2022	2023	2024	2025	2026	2027
Number of Orders		2	4	6	8	10
Average Order Value		144 357,72 €	151 697,03 €	191 303,42 €	230 633,96 €	268 152,60 €
Sales Revenues		**288 715,45 €**	**606 788,11 €**	**1 147 820,55 €**	**1 845 071,65 €**	**2 681 526,00 €**
Instalation fee		21 801,11 €	21 306,84 €	65 085,06 €	64 965,33 €	131 391,18 €
Mantainance Fees		- €	45 731,71 €	82 317,07 €	133 536,59 €	140 853,66 €
Total Revenues		**310 516,55 €**	**673 826,66 €**	**1 295 222,69 €**	**2 043 573,57 €**	**2 953 770,84 €**
Revenues Growth		*n.a*	*117,0%*	*92,2%*	*57,8%*	*45%*
COGS		158 793,50 €	333 733,46 €	631 301,30 €	1 014 789,41 €	1 474 839,30 €
COGS w/o mex. Inflation		149 382,40 €	321 237,33 €	611 252,23 €	984 372,30 €	1 431 465,88 €
COGS corrected for port. Inflation		156 358,56 €	336 239,11 €	639 797,71 €	1 030 342,49 €	1 498 315,34 €
Partner Comissions		19 620,99 €	60 334,69 €	132 661,92 €	178 651,72 €	245 020,35 €
Gross profit		**134 536,99 €**	**277 252,85 €**	**522 763,05 €**	**834 579,35 €**	**1 210 435,14 €**
GP Margin		*43,33%*	*41,15%*	*40,36%*	*40,84%*	*40,98%*
Operating Expenses						
Personnel Expenses		14 658,00 €	37 142,00 €	37 142,00 €	59 626,00 €	95 704,00 €
Distribution expenses		288,00 €	576,00 €	864,00 €	1 152,00 €	1 440,00 €
Marketing Expenses		10 574 €	2 856,00 €	7 210,00 €	5 336,00 €	7 690,00 €
Other operating expenses		3 828,00 €	6 086,10 €	6 782,40 €	9 917,10 €	15 725,10 €
Total Operating Expenses		29 348,00 €	46 660,10 €	51 998,40 €	76 031,10 €	120 559,10 €
EBITDA		**105 188,99 €**	**230 592,75 €**	**470 764,65 €**	**758 548,25 €**	**1 089 876,04 €**
EBITDA Margin		*33,88%*	*34,22%*	*36,35%*	*37,12%*	*36,90%*
Depreciation (Equipment)		6 250,00 €	12 500,00 €	18 750,00 €	25 000,00 €	31 250,00 €

PESSIMISTIC

INPUTS

Year	2022	2023	2024	2025	2026	2027
Years of operation	0	1	2	3	4	5
Revenues Inputs						
AMR's units per order	0	4	5	5	6	6
AGV's units per order	0	4	3	3	3	3
#Orders from AMR Repeat Clients	0	0	0	0	0	0
#Orders from AMR New Clients	0	1	0	1	0	1
#Orders from AMR 2nd year Contract Client	0	0	1	0	1	0
#Orders from AGV Repeat Clients	0	0	0	0	0	0
#Orders from AGV New Clients	0	0	0	0	0	0
#Orders from AGV 2nd year Contract Client	0	0	0	0	0	0
AMR Price per unit (€)	0	51 853,66 €	53 870,77 €	55 637,73 €	57 356,93 €	59 094,85 €
AGV Price per unit (€)	0	960 000,00 €	1 280 000,00 €	1 120 000,00 €	1 920 000,00 €	1 440 000,00 €
Instalation fee	0	21 801,11 €	22 649,17 €	23 392,06 €	24 114,88 €	24 845,56 €
Mantainance Fees	0	- €	45 731,71 €	82 317,07 €	133 536,59 €	140 853,66 €
Discount for Repeat Clients (applied on the Price)	0	5%	5%	5%	5%	5%
Costs Inputs						
Transportation/ Shipping costs (288 per shipping)	0	288,00 €	576,00 €	864,00 €	1 152,00 €	1 440,00 €
Personnel Expenses	0	14 658,00 €	37 142,00 €	37 142,00 €	59 626,00 €	95 704,00 €
Website Development expenses	0	4 060 €	216,00 €	216,00 €	2 216,00 €	216,00 €
Marketing expenses	0	2 400,00 €	2 640,00 €	2 880,00 €	3 120,00 €	3 360,00 €
Commissions (95% of installation & repair fee)	0	20 929,06 €	65 645,64 €	101 480,77 €	151 345,40 €	159 071,25 €
Fairs and Events	0	4 114,00 €	- €	4 114,00 €	- €	4 114,00 €
Comissions (% of installation & repair)	96%					
Other Expenses	15,00%					
COGS (% of sales)	65,00%					
Discount Rate	8,18%					
Corporate Tax Rate	21%					
Average Order Value per Client (base rate)	144 357,72 €					
Average Order Value per Client (percentage of base			14%	16%	31%	7%
Inflation Mexico		6%	4%	3%	3%	3%
Inflation Portugal		5%	3%	2%	2%	2%
Investment inputs						
Cost of equipment	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €	50 000,00 €
Cost of factory	0	0	0	0	0	0
Economic life (years of depreciation)	10					
Annual rate constant shares (%)	12,5%					
Salvage value before taxes	n.a					
Working Capital (% of following year sales)	n.a					
	3%					

P&L

Year	2022	2023	2024	2025	2026	2027
Number of Orders		1	1	1	1	1
Average Order Value		144 357,72 €	151 697,03 €	191 303,42 €	230 633,96 €	268 152,60 €
Sales Revenues		**144 357,72 €**	**151 697,03 €**	**191 303,42 €**	**230 633,96 €**	**268 152,60 €**
Instalation fee		21 801,11 €	21 306,84 €	65 085,06 €	64 965,33 €	131 391,18 €
Mantainance Fees		- €	45 731,71 €	82 317,07 €	133 536,59 €	140 853,66 €
Total Revenues		**166 158,83 €**	**218 735,57 €**	**338 705,56 €**	**429 135,87 €**	**540 397,44 €**
Revenues Growth		*n.a*	*31,6%*	*54,8%*	*26,7%*	*26%*
COGS		93 832,52 €	98 603,07 €	124 347,23 €	149 912,07 €	174 299,19 €
COGS w/o mex. Inflation		88 271,42 €	94 911,03 €	120 308,17 €	145 418,64 €	169 173,24 €
COGS corrected for port. Inflation		92 393,70 €	99 343,37 €	126 020,76 €	152 209,69 €	177 073,63 €
Partner Comissions		20 929,06 €	64 357,00 €	141 506,05 €	190 561,84 €	261 355,04 €
Gross profit		**52 836,07 €**	**55 035,20 €**	**71 178,75 €**	**86 364,35 €**	**101 968,76 €**
GP Margin		*31,80%*	*25,16%*	*21,01%*	*20,13%*	*18,87%*
Operating Expenses						
Personnel Expenses		14 658,00 €	37 142,00 €	37 142,00 €	59 626,00 €	95 704,00 €
Distribution expenses		288,00 €	576,00 €	864,00 €	1 152,00 €	1 440,00 €
Marketing Expenses		10 574 €	2 856,00 €	7 210,00 €	5 336,00 €	7 690,00 €
Other operating expenses		3 828,00 €	6 086,10 €	6 782,40 €	9 917,10 €	15 725,10 €
Total Operating Expenses		29 348,00 €	46 660,10 €	51 998,40 €	76 031,10 €	120 559,10 €
EBITDA		**23 488,07 €**	**8 375,10 €**	**19 180,35 €**	**10 333,25 €**	**- 18 590,34 €**
EBITDA Margin		*14,14%*	*3,83%*	*5,66%*	*2,41%*	*-3,44%*
Depreciation (Equipment)		6 250,00 €	12 500,00 €	18 750,00 €	25 000,00 €	31 250,00 €

EBIT	98 938,99 €	218 009,75 €	452 014,65 €	733 548,25 €	1 058 626,04 €
Interest Expenses	- €	- €	- €	- €	- €
EBT	98 938,99 €	218 009,75 €	452 014,65 €	733 548,25 €	1 058 626,04 €
Taxes Expenses	20 777,19 €	45 799,48 €	94 923,08 €	154 045,13 €	222 311,47 €
Net Income	78 161,81 €	172 293,28 €	357 091,58 €	579 503,12 €	836 314,57 €
Net Profit Margin	*25,17%*	*25,57%*	*27,57%*	*28,36%*	*28,31%*
CASH Flows					
NOPLAT	78 162	172 293	357 092	579 503	836 315
OPERATING CASH FLOW	84 412	184 793	375 842	604 503	867 565
CAPEX (Equipment)	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €
Salvage Value (Equipment)	- €	- €	- €	- €	- €
Salvage Value after taxes (Equipment)	- €	- €	- €	- €	- €
Net Working Capital level	95 121,01 €	222 705,99 €	380 485,25 €	484 544,77 €	542 978,83 €
Inventory	- €	- €	- €	- €	- €
Accounts Payable	- €	39 349,55 €	73 511,34 €	235 034,07 €	272 506,81 €
Receivable	- €	134 470,56 €	296 215,33 €	719 578,84 €	815 485,64 €
INVESTMENT IN NET WORKING CAPITAL	- €	95 121,01 €	127 582,98 €	104 059,52 €	58 434,06 €
INVESTMENT CASH FLOW	- 50 000,00 €	- 145 121,01 €	- 177 582,98 €	- 154 059,52 €	- 108 434,06 €
FREE CASH FLOW	- 50 000,00 €	- 60 709,20 €	7 210,29 €	168 060,31 €	450 443,60 €	759 130,51 €

INVESTMENT DECISION RULES

Net Present Value						
Year	2022	2023	2024	2025	2026	2027
Annual Cash Flows	- 50 000,00 €	- 60 709,20 €	7 210,29 €	168 060,31 €	450 443,60 €	759 130,51 €
Terminal Value	- €	- €	- €	- €	- €	15 080 080,54 €
Total Cash flows	- 50 000,00 €	- 60 709,20 €	7 210,29 €	168 060,31 €	450 443,60 €	15 840 221,06 €
Discount rate	8,2%					
NPV	11 058 149,41 €					
Internal Rate of Return	206,69%					
Profitability Index	222,16					

Break-Even Point Revenues	62 980,60 €	102 119 €	114 172 €	168 088 €	267 079 €
Break-Even Point (AGV)	1	1	1	1	1
Break-Even Point (AMR)	1	2	2	3	5
AGV units	4,00	6,00	6,00	6,00	6,00
AMR units	4,00	10,00	15,00	24,00	30,00
Percentage of sales mix AGV	50%	38%	29%	20%	17%
Percentages of Sales mix AMR	50%	63%	71%	80%	83%
Contribution Margin AGV	8 642,28 €	8 978,46 €	9 272,95 €	9 559,49 €	9 849,14 €
Contribution Margin AMR	20 741,46 €	21 548,31 €	22 255,09 €	22 942,77 €	23 637,94 €
Weighted Average Contribution Margin	14 691,87 €	16 834,61 €	18 545,91 €	20 266,12 €	21 339,81 €
Margin of Safety	78%	83%	90%	91%	90%

Simple Payback Period						
Discounted Cash Flow	-50,0	-56,1	6,2	132,7	328,9	10 696,5
Accumulated Discounted Cash-flow	-50,0	-106,1	-100,0	32,8	361,7	11 058,1
Payback Period	Year 4					

4,03 4 years 12 days to recover the investment

EBIT	17 238,07 €	4 124,90 €	430,35 €	- 14 666,75 €	- 49 840,34 €
Interest Expenses	- €	- €	- €	- €	- €
EBT	17 238,07 €	4 124,90 €	430,35 €	- 14 666,75 €	- 49 840,34 €
Taxes Expenses	3 620,00 €	866,23 €	90,37 €	- 3 080,02 €	- 10 466,47 €
Net Income	13 618,08 €	3 258,67 €	339,98 €	- 11 586,73 €	- 39 373,87 €
Net Profit Margin	*8,70%*	*1,40%*	*0,10%*	*-2,70%*	*-7,20%*
CASH Flows					
NOPLAT	13 618	-3 259	340	-11 587	-39 374
OPERATING CASH FLOW	10 868	9 241	10 000	13 413	-8 124
CAPEX (Equipment)	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €	- 50 000,00 €
Salvage Value (Equipment)	- €	- €	- €	- €	- €
Salvage Value after taxes (Equipment)	- €	- €	- €	- €	- €
Net Working Capital level	95 121,01 €	222 705,99 €	380 485,25 €	484 544,77 €	542 978,83 €
Inventory	- €	- €	- €	- €	- €
Accounts Payable	- €	39 349,55 €	73 511,34 €	235 034,07 €	272 506,81 €
Receivable	- €	134 470,56 €	296 215,33 €	719 578,84 €	815 485,64 €
INVESTMENT IN NET WORKING CAPITAL	- €	95 121,01 €	127 582,98 €	104 059,52 €	58 434,06 €
INVESTMENT CASH FLOW	- 50 000,00 €	- 145 121,01 €	- 177 582,98 €	- 154 059,52 €	- 108 434,06 €
FREE CASH FLOW	- 50 000,00 €	125 252,93 €	168 341,66 €	188 691,29 €	140 646,25 €	116 557,93 €

INVESTMENT DECISION RULES

Net Present Value						
Year	2022	2023	2024	2025	2026	2027
Annual Cash Flows	- 50 000,00 €	125 252,93 €	168 341,66 €	188 691,29 €	140 646,25 €	116 557,93 €
Terminal Value	- €	- €	- €	- €	- €	- € 2 316 952,96 €
Total Cash flows	- 50 000,00 €	125 252,93 €	- 168 341,66 €	- 188 691,29 €	- 140 646,25 €	- 2 433 510,89 €
Discount rate	8,2%					
NPV	- 2 203 609,23 €					
Internal Rate of Return	#NUM!					
Profitability Index	-43,07					

Break-Even Point Revenues	80 184,05 €	128 612 €	139 753 €	203 039 €	317 041 €
Break-Even Point (AGV)	1	1	1	1	1
Break-Even Point (AMR)	1	2	2	3	5
AGV units	4,00	6,00	6,00	6,00	6,00
AMR units	4,00	10,00	15,00	24,00	30,00
Percentage of sales mix AGV	50%	38%	29%	20%	17%
Percentages of Sales mix AMR	50%	63%	71%	80%	83%
Contribution Margin AGV	8 642,28 €	8 978,46 €	9 272,95 €	9 559,49 €	9 849,14 €
Contribution Margin AMR	20 741,46 €	21 548,31 €	22 255,09 €	22 942,77 €	23 637,94 €
Weighted Average Contribution Margin	14 691,87 €	16 834,61 €	18 545,91 €	20 266,12 €	21 339,81 €
Margin of Safety	44%	15%	27%	12%	-18%

Simple Payback Period						
Discounted Cash Flow	-50,0	-115,8	-143,8	-149,0	-102,7	-1 642,4
Accumulated Discounted Cash-flow	-50,0	-165,8	-309,6	-458,7	-561,3	-2 203,7
Payback Period	Year 4					

3,66 4 years -125 days to recover the investment

Appendix 60 – Scenario analysis details