

## Portuguese industry in emerging markets

Assessment of metalworking industry that supports the oil and gas sector in Angola and the critical factors for success in the process of internationalization

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### **Abstract**

In spite of the advantages inherent to the process of globalization, there are negative effects such as deindustrialization and the decrease of industrial jobs. An opportunity for the industrial sector in Portugal may be to aim at emerging economies as the PALOP, namely Angola. The current thesis intended to study the metalworking industry market that supports the oil and gas sector in Angola, and hence to understand current opportunities and its critical success factors, by conducting interviews to the main market players. This work creates a base for future development, given that fact that there are insufficient studies to Portuguese companies be informed about the current situation of the Angolan market and the knowledge of the critical success factors for a company to succeed in Angola were not properly structured and valued in the literature. The critical success factors identified as relevant were validated by a reliability analysis using the Cronbach Alfa method.

**Key-words: international entrepreneurship, metalworking in Angola, critical success factors, Cronbach Alpha.**

### **1 Introduction**

In recent decades, it has been witnessed a continuous growth in the level of globalization in Europe which allowed consumers to reach a greater offer of products at increasingly competitive prices (Hismanoglu 2012; Lee 2006). Despite the benefits of economic globalization, Bluestone & Harrison (1988) drew attention to the increasing industrialization and inequality effect while the evolution of globalization. Some existing literature suggests that the globalization of production has happened partially to replace domestic manufacturing, which resulted in a demand for less skilled labor in developing countries, reducing manufacturing employment in developed countries (Rees & Hathcote 2004; Wood 2004). As a matter of fact, the increasing globalization coincides with the declining of industrial employment in developed democracies (Brady et al. 2007).

However, as a result of globalization, new opportunities arise for internationalization, not just for large multinational companies, but also for SMEs. Traditionally, multinationals were responsible for large flows of international trade and foreign direct investment, which are the main drivers of globalization, however the cross-border trade of small and medium enterprises gained prominence.

Metallurgy and Metalworking sector is one of the main industrial activities of the Portuguese economy. According to the president of AIMMAP<sup>1</sup>, its importance is due to the fact that it is a sector that creates jobs, generates investment and contributes with a key part of Portuguese exports. In 2011, this sector, which exports more than 40 percent of its production, was directly responsible for about a third of manufacturing exports, amounting to more than EUR 12 billion. It is characterized by a great diversity of productive spheres. Mainly since 2008, there has been a slowdown in the metalworking industry market, either by reducing the industrial production index, or by decreasing level of employment in the sector (INE). Despite the difficulties, there are strengths and opportunities for the Portuguese metal industry. Based on information provided by ANEMM<sup>2</sup> is possible to identify the PALOP market as an opportunity for Portuguese companies, particularly Angola. This market represents an opportunity because of the good economic and cultural relations between the two countries. Portuguese exports to Angola have grown 330 % between January 2005 and June 2013 (INE).

Over the last decade, Angola has become one of the largest oil producers in Africa. The oil and gas sector plays an extremely important role in the Angolan economy, since 98 % of its revenue is due to exports and it represents more than 75% of the state income. In 2010 the oil sector in Angola represented about 47 % of GDP (EIU). Because of the need for maintenance and construction of platforms, pipelines and refining elements, the Metalworking companies represent a significant part of the oil and gas industry's suppliers.

## **Objectives**

Considering the context present above and the available literature, it was identified the following objectives:

1. Identification of the existence of a relation between the perception of the internal market and the volume of external sales com a company;
2. List and prioritization of the critical success factors regarding the industry being study and comparing them with the literature;
3. Organization of the information collected and identification of opportunities for Portuguese companies and for future research.

## **2 Literature review**

### **2.1 Conceptual framework**

The current work is covered by the concept of international entrepreneurship. A definition of this term recognized in the literature and presented by (Oviatt & McDougall 2005), as "the discovery,

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<sup>1</sup> Journal Portugal Global Edition n.º 47.

<sup>2</sup> ANEMM (2000), Diagnóstico Prospectivo da Indústria Metalúrgica e Metalomecânica.

enactment, evaluation, and exploitation of opportunities, across national borders, to create future goods and services”. This definition results from a growing understanding along several years, that include empirical studies of companies, focusing in the recognition and exploitation of opportunities (Zahra et al. 2005).

## 2.2 Critical success factors for the internationalization process

As noted in the literature, a company must meet a set of factors in order to gather conditions to initiate its process of internationalization (Simões 2010). According to studies that list critical success factors to the process (Hessels 2008; Trigo et al. 2009), these can be divided in two categories: factors related with the company or related with the individual person. They are usually composed of the topics listed in Table 1. All the identified topics evolve positively with the ease of internationalization of a firm.

Additionally, there are environmental constraints that influence the decision of a firm to internationalize, including the positive impact of lower production costs in the domestic market (Axinn 1988) and the small size of the domestic market (Rasmussen et al. 2001). However, (Hessels 2008) suggests that the perception of the internal market has no influence on the probability of a company to export. This in a certain way, contradicts the assertion that the small size of the domestic market has a positive impact on exports.

Theme	Subtheme	Articles
Company	• Innovation	Gadene, 1998; Trigo, 2009
	• Distribution channels	Gabrielsson & Kirpalani 2004; Trigo, 2009
	• Dimension	Chandler, 1990; Lu & Beamish, 2001
	• Finances	Mundim, 2000
Individual	• International experience	Trigo, 2009
	• Education	Trigo, 2009
	• Information market access	Buckley, 1989; Qian, 2002
	• Sales performance	Hessels, 2008; Loana et al, 2007

**Figure 1 - Topics found regarding critical success factors for internationalization and its existing literature.**

The existing literature on the topic of internationalization is quite wide, with a particular focus in recent years, however, studies of the Portuguese reality are scarce (Trigo et al. 2009). Yet it is possible to identify characteristics of the Angolan market topics relating to distribution channels and access to market information: 1. The outbound logistics of a project in Angola presents several peculiarities, due to saturation of the Angolan ports, obsolescence of equipment and systems and bureaucracy of the import process (Costa 2010), 2. In order to establish a network

of contacts and collect market information, consortia are usually a gateway in Angola (Sousa & Silva 2008).

### 3 Empirical analysis

#### 3.1 Methodological considerations

Within the thesis master's thesis, the methodology to be followed will be the implementation of the 4 phases shown in Figure 4. As suggested by (Wiig & Kolstad 2010), due to the general lack of information about the activities of companies in Angola, the collection of empirical data was taken by structuring an interview script. Of the total of 11 identified companies that participate in the metalworking industry market that supports to the oil sector, were interviewed 8. Additionally, there were also interviewed 4 partner companies, belonging to the sectors of engineering (2) and electric maintenance (2), resulting in a total of 12 interviews. The script deals with the themes: 1. Market information, 2. Information about the company, 3. Intensity of market forces, 4. Business Model and 5. Prospects of development of the market.

<b>Phase I</b>	<ul style="list-style-type: none"> <li>• Organization of the available information about the market;</li> <li>• Identification of the market players.</li> </ul>
<b>Phase II</b>	<ul style="list-style-type: none"> <li>• Development of an interview script;</li> <li>• Scheduling interviews with the main market players.</li> </ul>
<b>Phase III</b>	<ul style="list-style-type: none"> <li>• Performing the interviews;</li> <li>• Systematization of gathered information.</li> </ul>
<b>Phase IV</b>	<ul style="list-style-type: none"> <li>• Information and data analysis.</li> <li>• Reliability analysis</li> </ul>

**Figure 2 - Methodology used for collecting and analyzing information.**

In order to quantitatively analyze the data, it was performed a survey where each of the assessed companies had to list the factors their considered critical to be successful in that market. Then the answers were allocated to the correspondent themes identified in the literature and quantified by their importance, according to the number of positive answers to each theme. Subsequently, an analysis was conducted of the reliability. Any reference to issues of data reliability raises the mentioning of Cronbach Alpha (Maroco & Garcia-Marques 2006). Assuming the importance of each topic is given by the sum of the response (if the company considered the topic important is assigned a 1, otherwise a 0), i.e.,  $X = Q1 + Q2 + \dots + Q12$ , the index is given by the following formula (Cronbach 1951):

$$\alpha = \frac{K}{K-1} \times \left( 1 - \frac{\sum_{i=1}^K \sigma_{Q_i}^2}{\sigma_X^2} \right)$$

Where K is the number of questions for each test performed / topic, in this case equals the number of firms surveyed;  $\sigma_x^2$  is the variance of each test and  $\sigma_{Q_i}^2$  is the variance of the importance given by each company to the topics. Thus, the greater the agreement between the respondents regarding each topic relevance and, closer to 1 give the alpha. In general, a test is classified as having adequate reliability when alpha is at least 0.7 (Maroco & Garcia-Marques 2006).

For secondary data, under the first objective variables "turnover in Portuguese industry in the domestic market", "assessment of domestic demand in manufacturing", "total Portuguese exports" and "exports of metal products, except machinery and equipment for the PALOPs " were used (INE).

### 3.2 Portuguese Industry

Based on the listed variables, an analysis was performed using the correlation index for the crossing of variables shown in Table 1. In spite of Portuguese exports, either in total or for PALOPs, having presented an upward trend between 2005 and 2012, the same did not happen with the variables under the column Variable 1.

Variable 1	Variable2	Time horizon	Correlation
Portuguese industry turnover in the domestic market	Total Portuguese exports	2005 - 2012	0,04
Assessment of domestic demand in manufacturing	Portuguese exports of metal products, except machinery and equipment for the PALOP	2005 - 2012	- 0,66
Assessment of domestic demand in manufacturing	Total Portuguese exports	2011 - 2012	- 0,96

**Table 1 - Correlation between listed variables**

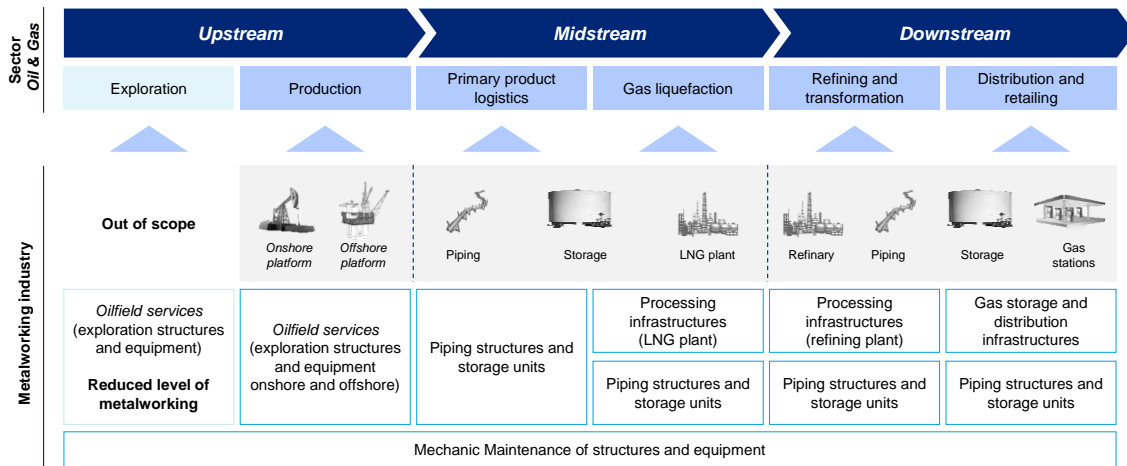
It seems clear the inverse relationship between the assessment of domestic demand of the manufacturing industry and Portuguese exports, but 0.5 should be the upper limit of effectiveness in the forecasting exercise of a variable as a function of another, i.e., even if the correlation is very high, the evolution of a variable should not justify more than 50% of the result of another (Cohen 1988). That said, it is likely to say that when assessing the Portuguese manufacturing industry is derogatory, there is a tendency for exports, particularly of fabricated metal products, to rise.

### 3.3 Metalworking Industry in Angola

#### **Market characterization**

The industry being study deals more specifically with the construction, modification and maintenance of steel structures for the production, processing, transportation, storage and distribution of oil and gas products. The type of construction differs according to the stage of the

value chain of the oil industry, which is divided into upstream, midstream and downstream. In turn, these segments are divided into exploration and production, primary product logistics and gas liquefaction, refining and processing and distribution and retailing.



**Figure 3 – Metalworking industry that supports the oil and gas sector value chain.**

Source: Interviews and Deutsche Bank (2010)<sup>3</sup>.

End customers for services of metalworking companies are international oil operators (especially at upstream) and the national operator Sonangol, including through its subsidiaries (mainly in midstream and downstream). Regarding the hiring process, the choice of the company generally results of a public tender or a direct invitation to the desired company, which may be hired as main contractor (turn-key project) or as a subcontractor. In turn, a main contractor may subcontract metalwork of other companies in the sector when it does not have enough capacity or lacks the skills needed to complete the entire project.

Along the value chain, market requirements differ. In the upstream segment, the demand for metalworking services is directly related to the level of exploration and production of Oil & Gas. In this segment, demand has a very high level of demand since the oil companies are committed to building a picture of health, environment and safety, requiring high levels of certification to contractors.

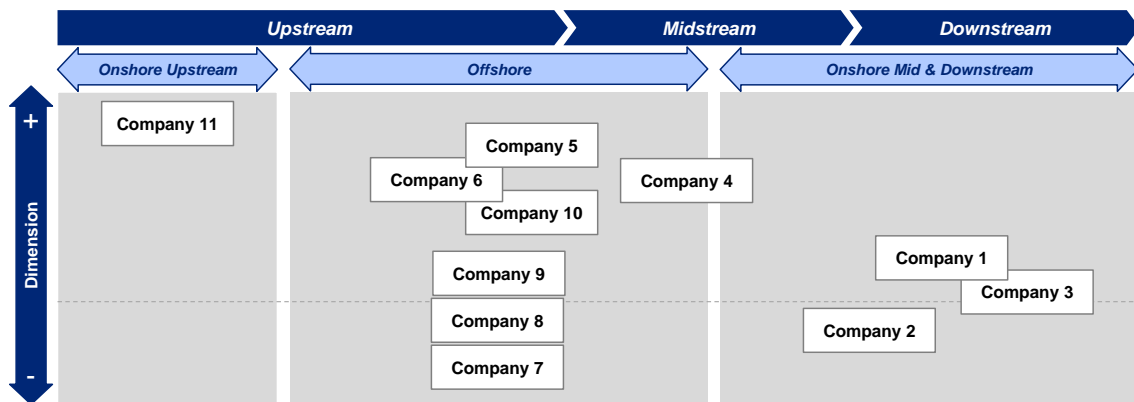
The midstream segment is composed mainly of the construction and installation of pipelines, storage tanks and the industrial plant for the processing and transformation of natural gas into liquefied natural gas (LNG) so that it can be transported to the market place for consumption. The latter comprehends a great diversity of complex processing equipment (not only metallic nature) and structures of gas transmission and storage. The complexity of the project depends on the developed components, necessary equipment, inputs and specialized know-how.

The downstream segment includes refining and processing (industrial unit for processing into usable petroleum products) and distribution and retailing of petroleum products (equipment is

<sup>3</sup> Deutsche Bank (2010), Oil and Gas for beginners, Integrated Oils.

intended for storage and transportation of derived products to the final consumer). This last sub-segment usually has a lower level of complexity comparing with the rest of the industry value chain.

On the supply side, the market for the metal industry in support of the oil sector is composed of eleven companies, with particular concentration in the offshore segment. Despite of Figure 3 showing a static structure where each company is allocated to a particular segment, this does not mean that in some projects they cannot get out of your comfort zone and perform work in other segments.



**Figure 4 - Relation between companies positioning in the value chain and its dimension.**  
Source: interviews

According to the results obtained in the interviews, the market is far from saturated. Despite some intensification of the number of players in recent years, the market would only win with this growth, making it more dynamic. One of the factors that contributed to this dynamism is the presence of firms with different dimensions and powers.

### **Critical Success Factors**

According to the methodological considerations presented, it was asked to 12 respondent companies to list the critical success factors of the market. The answers offered by companies can be aligned with the main topics discussed in the literature in the way shown in Table 4. Assuming the sum of each row as the importance given to each topic, the more relevant critical success factor for a company of metalworking operations in Angola is its financial capacity, followed by its competence in accessing market information and the sales team performance. Yet, it was also given importance to the distribution channels topic and size of the company.

<i>Topic</i>	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	T
Finances	1	1	0	0	0	0	1	1	1	1	0	1	7
Market info access	1	0	0	1	0	1	1	1	0	0	1	0	6
Dimension	0	0	1	0	1	1	0	1	0	0	0	0	4
Sales performance	1	0	1	1	0	0	1	1	0	0	1	0	6
Distribution channels	1	0	1	0	1	0	0	1	1	0	0	0	5
Innovation	0	0	0	0	0	0	0	0	0	0	0	0	0
International experience	0	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 2 – Survey results regarding critical success factors**

According to the answers given, the resulting Cronbach Alpha is 0.79, which suggests that the results can be considered reliable. Comparing the importance given to each of the topics and comparing them with the literature review, it is clear that besides the literature is scarce, only the distribution channels issues, size and access to market information are mentioned. The finance and sales performance issues occupy prominent places according to the empirical analysis, yet are not mentioned in the literature.

Theme	Subtheme	Articles	% of companies that consider the topic relevant
Company	• Innovation	x	0 %
	• Distribution channels	Costa, 2010	42 %
	• Dimension	IDC, 2012 <sup>(1)</sup>	33 %
	• Finances	x	58 %
Individual	• International experience	x	0 %
	• Education	x	0 %
	• Information market access	Sousa e Silva, 2008	50 %
	• Sales performance	x	50 %

**Table 3 - Comparison between the relevance of critical success factors and the literature review about Portuguese companies in Angola.**

### ***Opportunities assessment***

The assessment of potential investment opportunities in the metal industry that supports the oil & gas sector was based on the creation of several scenarios in order to analyze the attractiveness of different positions and market performance. However, the choice of the most attractive scenario will depend from company to company, in accordance with their qualifications and outlined strategy. But regardless of the scenario, the critical success factors analyzed in this dissertation should be taken into account in order to minimize the investment risk and enhance guarantees of its operation to be successful.



## 4 Conclusions

Taking into account the results obtained, it can be concluded, first, that there is indeed room for Portuguese companies to internationalize to the metalworking industry in Angola. Being the reduced maturity a characteristic of this market, despite representing some difficulties, also means that there is potential for the market to receive new participants. The ideal market segment will depend on each company, but it tends to be preferable for a company of smaller size to start up as a subcontractor, performing metalworking projects for larger companies.

In response to the first objective of the dissertation, contrary to the assertion by (Hessels 2008), it was observed that for the Portuguese case, the variation in perception on domestic demand is a factor that influences the decision of a company to turn to external markets. This may explain in part the reason for the recent growth of Portuguese exports.

However, there are insufficient studies to Portuguese companies be informed about the current situation of the Angolan market. Knowledge of the critical success factors for a company to succeed in Angola were not properly structured and valued in the literature - this work has been the major contribution of the dissertation. Through surveys, it was not only possible to confirm the most important issues business for this industry, as well as to compare the relevance between them.

For the critical success factors, the most important conclusions that can be drawn are:

- The need for financial resources for a company is the most important issue, according to market participants in the study, and yet there is no study in the literature review that mentions this concern;
- The performance of the sales team also deserves mention, but no information is available in the literature review, with the aggravating circumstance that this is a market where the clients have specific needs;
- Being the internationalization of Portuguese companies in Angola, a relevant theme, all topics identified (channels of distribution, size, resources and finances of the company, access to market information and sales team performance) deserve to be studied further.

Moreover, issues identified as critical success factors for generic cases, such as innovation, international experience and education of employees, were not identified as relevant for the metalworking industry supporting for the oil and gas industry in Angola.

In short, Angola is a country with potential for this sector and the appreciation of the domestic market showing a reduced rate, companies seek refuge in this market. However it is necessary to take into account the requirements that it needs, with particular focus on the financial strength of the company, the performance of the sales team and potential for market access.

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