



Agroforestry Industry: Current Situation and Prospects for Successful International Integration - The Case of Cork in North Africa

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Abstract.

The aim of this study is to analyze the Algerian cork sector and identify the necessary performance factors for successful integration into the international market. The study was based on a survey conducted among cork processors in the Jijel province. It enabled us to develop a typology of these processors and classify them according to well-defined criteria. According to our findings, cork product exports have shown an irregular trend during the years under study. Several factors contribute to this situation in the cork sector, with the most significant being the decline in raw cork production, which has made it difficult for these companies to maintain a stable supply in terms of quantity and quality. The poor quality of the harvested product also affects profitability and reduces the market value of the final product in international markets. Additionally, competition in the local market for raw cork and the lack of financial support for equipment investments necessary for the production of high-value products have further contributed to this situation. As a result, a significant number of companies have ceased operations due to declining profitability resulting from the poor quality of cork and rising prices of raw cork. The widespread use of grinding processes that produce semi-finished products with low technical

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specifications and lower added value has further exacerbated the overall profitability of the sector.

Key words: Cork; Exportation; Industry; Quality; Typology.

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INTRODUCTION

The rapid development of international trade has been driven by the ideology of globalization, which advocates for international division of labor and liberalization of trade between countries within the framework of a market economy. It offers opportunities for developing countries to create legal channels to access the markets of developed countries, acquire know-how, and increase their share in global income.

The global economy, including agriculture, is expanding rapidly thanks to trade. Moreover, exports from developing countries are becoming more diversified, reducing their dependence on agricultural exports compared to the past. International trade in agricultural products has also grown faster than global agricultural GDP (FAO, 2005).

However, developing countries have been working extensively on harnessing their economic potential, especially their natural resources, for which they generally have a comparative advantage. The Algerian economy remains relatively undiversified, with a low diversification index of 2.1 in 2005 (OCDE, 2007), compared to neighboring countries such as Morocco and Tunisia, which have

diversification indices of 34.7 and 30.6, respectively.

In OECD countries, the contributions of SMEs to global exports vary between 20 and 40% (APCOR, 2009a). However, these figures are lower in the MENA region.

On the other hand, several indicators suggest that Algeria has the potential to penetrate international markets for agricultural products, as it possesses effective resources that enable it to gain a competitive advantage. Moreover, historical evidence shows that the Algerian economy has been an exporting economy for various agricultural products for centuries. Due to its size, Algeria has a wide range of agricultural products, some of which are specific to the Mediterranean region to which it belongs (comparative advantage).

Among these specific products, forest products are a significant source of value-added for the country. They offer numerous advantages and encompass a wide range of exportable raw or processed products. Within this range, cork is the most valued forest product in Algeria. It has long been a source of foreign exchange revenue for the nation and a source of income for the rural population. The regions where it is produced have become the foundation for a concentration of cork processing companies.

The global production of cork is approximately 200,000 tons, with Portugal leading the way at 46% (85,000 tons) (APCOR,2009b). The analysis of the global cork market reveals that Portugal is the world leader in cork and its derivatives exports, accounting for 62.1% in 2019. Spain ranks second with 18.1%, while Algeria represents only 0.45% of the total value of global cork exports (Chenel, 1951), despite having more than 5% of the world's cork potential.

However, Algeria used to be one of the top three cork producers, especially in the last century when it was the leading exporter of cork to Europe. Cork was harvested on an area of over 400,000 hectares. Algerian cork exports reached their peak in 1928 with 502,000 quintals, and notable highs were also recorded in 1913 (423,000 quintals) and 1939 (480,000 quintals). The production of processed cork, which experienced significant growth starting in 1920, reached 41,000 quintals in 1938. That year, there were 58 industrial companies employing 35,000 workers. The Algerian industry was more concentrated than the metropolitan industry and presented remarkable examples of vertical integration (Berchiche, 1986).

The expansion of exports in an export-oriented sector, supported by significant natural productive potential, is a major challenge in the context of diversifying the Algerian economy. Consolidating the efficiency of the production apparatus in various

strategic sectors is undoubtedly a key aspect of this diversification policy.

The purpose of this study is to answer the following question: why have exports of cork agglomerates and granules increased in recent years? And what is the most appropriate development path for the cork industry?

MATERIALS AND METHODS

In order to address this question, we deemed it necessary to conduct a survey among cork processing companies, selecting a region with a high concentration of such companies as the survey site. To achieve this, we followed the following approach:

Firstly, in order to gather the necessary information, we conducted a preliminary survey with institutions involved in the functioning of the cork sector in the Jijel province, including the Forest Conservation Department, the National Institute of Forest Research, forestry companies, and the Jijel Chamber of Commerce.

Secondly, we conducted a survey among nine (9) cork processing and export units in the Jijel province, which engage in export activities, particularly for agglomerates and granules.

The selected sample is exhaustive as it includes all active companies in the sector. The choice of the Jijel province as the study area is justified by the high concentration of cork processing companies.

The importance of cork exports: export prices

Cork exports are exempt from taxes and duties, which is intended to attract local and foreign investment. Additionally, since the majority of processed products find their markets

in the international market, the selling price applied for exports is a crucial reference for local processors, as it determines the level of their profit margin.

Table 1. Gap between export price and local price - Difference between export price and local price.

Product	Selling Price in Algerian Dinar (DA)		
	<i>local</i>	<i>export</i>	<i>Gap</i>
Agglomerate (m ³)	7997	9468	1470
Granules quintal (q)	1900	4500	2600

The analysis of Table 1 demonstrates that exporting enables a higher value for transformed cork production by offering significantly higher prices than domestic prices. However, the gaps vary from one product to another. Thus:

1. **For agglomerates:** The export selling price is approximately 20% higher than the domestic price, indicating that the local market remains promising and attractive, especially with the expansion of the construction market. The National Cork Enterprise (ENL) is the largest producer of agglomerates in Algeria.

2. **For granules:** The export selling price is 150% higher than the local price. Granules are often used in the production of agglomerates, and due to the quasi-monopoly held by the ENL, they impose a price of 1900 DA per quintal on granule producers, which is significantly higher than their production costs. This situation has been exacerbated by the enforcement of Article 84 of Law No. 06-24 of 26/12/2007, which requires compliance with specific export

requirements for granules, resulting in additional expenses and delays in the shipment of goods, leading to a loss of clientele abroad. However, the effects of this law have been beneficial for the ENL, implicitly reinforcing its quasi-monopoly position in the domestic granule market.

Overall, it can be concluded that cork exportation represents the best solution for valorizing our transformed products and indirectly our cork forests.

Evolution of cork product exports by companies in the Jijel province

The graph below illustrates a significant overall increase in cork exports. The evolution of the revenue generated from exports is highly erratic, with the year 2019 standing out as exceptional, reaching a value of 2,691,031 Euros.

Granules have been the most exported product during the past five years, accounting for more than 50% of the annual exports on average, with a 300% increase over the five-year study period. Granules are considered



a low-value raw material locally, undergoing only one grinding operation that requires minimal equipment investment. This grinding activity has become prominent locally, with the added value captured in foreign markets where the product undergoes significant value-added processes.

Agglomerates, on the other hand, experienced stability during the period 2017-2020 and then witnessed an increase in 2020-2021, with a 300% growth. This evolution is justified by the growing demand for this product in international markets.

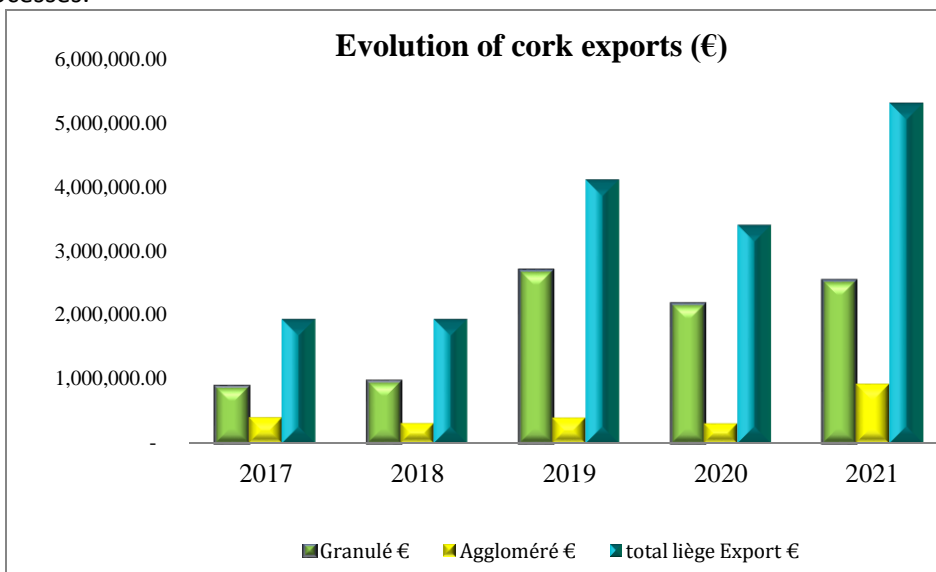


Figure1. Evolution of exports of cork and its derivatives by Jijel companies in value

The sustainability of the operation of these processing companies on a full-time basis is a crucial factor in ensuring the continuity of cork exports and the continuous exploitation and valorization of our cork forests. To identify the causes of the difficulties encountered in ensuring the sustainable operation of these companies, we conducted a survey at the company level.

Typology of surveyed transformers

The aim of the typology we are attempting to establish here is to provide a characterization that allows for the classification of cork transformer-exporters into identifiable groups based on their level of performance. To assess the performance of these companies, the chosen criterion is their ability to sustain their export activities. To achieve this, we employ Principal Component Analysis (PCA) using STATISTICA 6 software.

We have selected seven (7) variables: experience, turnover (CA),

and operating rate, number of processed products (NPT), equipment status, quality assessment, and regularity in planned purchases by the Forest Conservation Department. According to the result of the processed eigenvalues, the 1x2 plane provides a good quality of representation equal to 72.32%.

RESULTS AND DISCUSSION

Results regarding the variables

The projection of the selected variables (experience, turnover, operating rate, etc.) onto the 1x2 plane is presented in the following circle

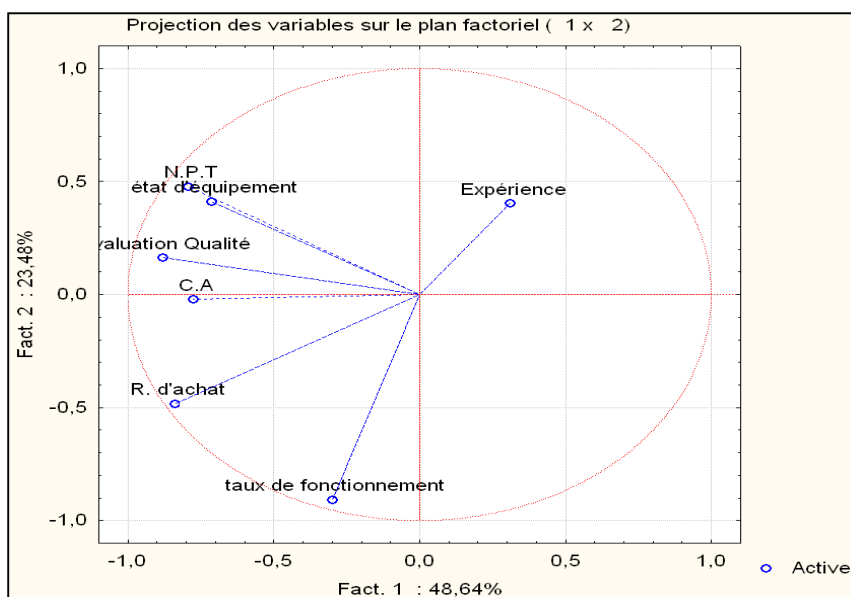


Figure2. The projection of the variables on the factorial plane

Examining the correlation circle of the variables on the principal plane reveals that the variables that are strongly correlated are the number of processed products, quality assessment, regularity in purchases, and operating rate. Equipment status and turnover follow with lower correlation rates. On the other hand, the variable "experience" shows a

contrasting relationship with the six aforementioned variables, indicating a weak correlation.

Results regarding the individuals

However, the projection of the individuals onto the 1x2 factorial plane reveals the presence of four distinct groups, as shown in the following graph.

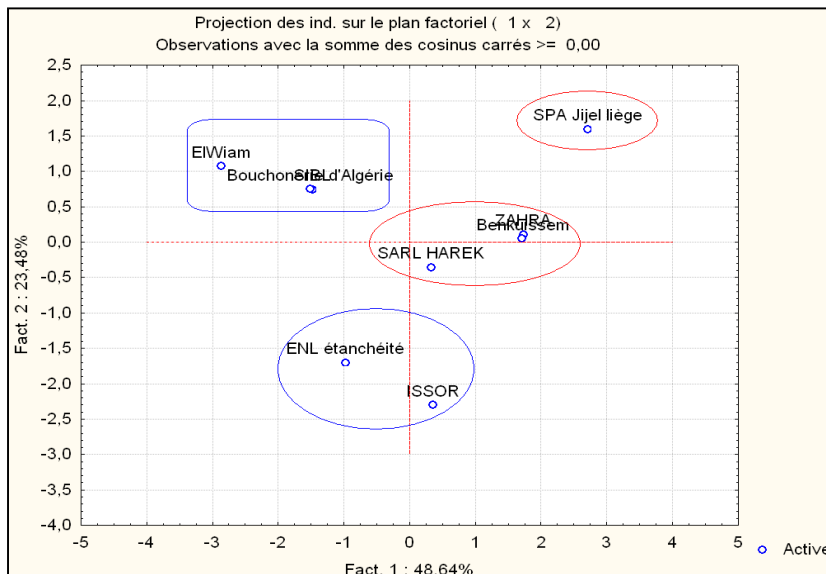


Figure 3. Projection of individuals on the factorial plane (1x2)

Group 1: Comprised of 3 companies: El WIAM, SIBL, and Bouchonnerie d'Algérie. This group represents the strongest exporters of transformed cork, with regular and significant shipments. They are characterized by:

- A wide range of manufactured products: These companies export multiple cork products, including corks, agglomerates, washers, sole plates, and granules. This diversity allows them to maintain their exports even when they cease the production of certain products.

- Notable expertise in assessing the quality of cork offered in the market: Their precise evaluation results in fewer waste during the selection process in their factories and ensures good economic profitability. Furthermore, the leaders of these companies have demonstrated their

in-depth knowledge of cork forests and the quality of their cork.

- Regular participation in cork procurement, indicating a slightly higher operating rate than the average. This suggests their financial capacity, as regular cork purchases require financial ease.

- The highest turnover among the exporters. Thus, we can understand it as the outcome of the combination of the aforementioned variables that contribute to increased sales.

Group 2: Comprised of two companies: ENL and ESSOR (Chinese Investor). This group is characterized by specialization in the manufacturing of a single product and a high operating rate. The Chinese company operates its equipment at 100% capacity and participates in all auctions. The National Cork Enterprise

(ENL) achieves high operating rates, surpassing, on average, 90% of its processing capacity due to the availability of an ample supply of raw materials. Its agglomerate production is fully sold, enabling regular exports and a relatively significant turnover.

Group 3: Formed by three companies: SARL HAREK, BEN KUICEM, and ZAHRA. This group is characterized by the production of a single product, limited experience of not more than three years, a low operating rate, standard equipment, approximate evaluation of purchased cork quality, and average participation in auctions. This group maintains continuity in its export activities but generates lower turnover compared to the previous two groups.

Group 4: Consists of a single company, the public enterprise SPA Jijel Liège (Unit 14). It specializes in the production of a single product (corks), possesses extensive experience in the field, has outdated equipment, low participation in auctions, and approximative evaluation of cork quality. Despite its experience, this company struggles to sustain its operations and generates very low turnover, with value-added created not exceeding 25% of the turnover.

Factors for the sustainability of agglomerate and granule exports

Discontinuity in exports has become a characteristic phenomenon in the foreign trade of cork products. This fact can largely explain the difficulties in maintaining export activities continuously. However, while financial analysis using financial ratios is often used to understand static situations, there are underlying factors that are crucial for analyzing dynamic situations.

The key determining factors in the export equation of these two products are as follows:

Cork quality

Cork quality is a crucial factor in the cork transformation process, especially for the production of cork stoppers, the primary high-value product derived from transformed cork. Given the different types and categories of cork available in the markets, the criteria sought by processors are as follows:

- Thickness of cork planks
- Cleaness
- Maturity

According to the processors, the hierarchy of their preferences among these criteria is presented in the following table:

Table 3. Hierarchy of cork quality evaluation criteria

Criterion	Number of responses (frequency)	Percentage (%)
Thickness	5	38,45
Cleaness	6	46,15
Maturity	2	15,40
Total	13	100

Source: Our survey



We observe that cleanness is the most important criterion in assessing the quality of cork placed on the market, with 46%. Cleanness refers to the cleanliness of the cork, evaluated based on the examination of all intrinsic characteristics of the natural product: absence of yellow stains, damp or earthy cork, etc. Deviations in these characteristics can have a negative and sometimes disastrous impact on the market value of the finished products.

Thickness of the cork planks comes in second place with 38.5% of the responses; the ideal thickness is

one that allows for the maximum production of cork stoppers per plank. Maturity of the cork ranks last with 15.4%.

Quality of delivered cork

The quality of the final product of natural cork is closely linked to the quality of the raw cork. The assessment of the quality of delivered cork by the processors is done through the question: "How do you judge the quality of the delivered cork?" The responses obtained are presented in the following table.

Table 4. Evaluation of the quality of the delivered cork

Evaluation	Responses	Percentage
Good	0	0%
Average	4	50%
Poor	4	50%
Total ¹	8	100%

Total¹, which reflects the number of responses we were able to obtain.

According to the transformers, the cork currently delivered or offered in the local market is not of good quality at all. Their opinions are evenly divided between "rather poor quality" or "average quality." However, the assessment of cork quality by the transformers varies from one transformer to another. Transformers with extensive experience in the field have proven skills that enable them to accurately assess the quality of cork lots to be purchased. This ability is the result of several factors, such as:

- Mastery of cork quality in the warehouses.
- Experience in cork procurement.
- Prior knowledge of the quality of stacked cork in the exploited cork oak forests.
- The quality requirements in foreign markets.

The classifications carried out at the transformation units are the true means of assessing the quality of cork in our cork oak forest.

Table 5. Losses in value caused by poor quality cork.

Loss in value%	frequency	%
20	1	14,3
40	1	14,3
50	2	28,6



80	3	42,8
Average: 57,14	Total : 7	100

The poor quality of cork offered in the regulated market leads to a significant loss in market value for transformed products. According to Table 5, some products devalue by losing an estimated 80% of their market value. According to all transformers, the average loss in value due to poor cork quality for these products is 57.14%.

However, the devaluation of cork-derived products depends not only on the intrinsic quality of the cork but also on other complementary factors, the main ones being:

- Experience in the field: Expertise plays a crucial role in valuing different types of cork quality. This is why we observe lower levels of value loss among experienced transformers compared to newcomers.
- Technology of transformation equipment: Transformers with high-

tech and advanced processing equipment experience lower rates of value loss because they can valorize waste, low-quality cork, and products with defects.

- Financial capacity of transformers: Those with financial stability regularly purchase good-quality cork, even if it means paying a higher price for it.

Quality of the Exported Product

The quality of the final exported product depends largely on several factors other than the quality of the raw cork, including:

- Expertise
- Condition of the manufacturing equipment
- Ability to satisfy customers

The assessment of the quality of the exported products by the transformers is presented in Table 6.

Table 6. Assessment of the quality of the product intended for export

Evaluation	Responses	Percentage
Good	4	44,45%
Average	2	22,22%
Poor	3	33,33%
Total ¹	9	100%

The assessment of the quality of finished products intended for export varies from one transformer to another. Millers attribute a positive assessment to their products since they are actually semi-finished products that require a low level of

technicality. This assessment is the same whether it is agglomerated cork or cork sheets.

The overall degradation of the quality of stripped cork, considered as the first link conditioning the quality of the finished product, has made



agglomerated cork and granulated cork the two main cork transformation activities.

Insufficiency of raw cork

The volume of exports largely depends on the volume of raw cork

transformed. Therefore, the availability of an adequate quantity of raw cork is the only means to ensure and plan export actions. The results regarding this availability in the regulated market are as follows:

Table 7.Assessment of the availability of raw cork

The quantities delivered	Yes	No
Insufficient.	9	0
Percentage	100%	0 %

We observe that all cork transformers suffer from a shortage of raw cork, which prevents them from maintaining a steady flow of exports. According to them, the main causes of this insufficiency are:

- Under exploitation of cork from cork oak forests: The demand for raw cork in the transformation process is much higher than the current supply from the cork oak forests.

- Emergence of new entrants periodically in the transformation sector without a genuine concern for

Purchase price

The price of raw cork is a crucial factor for the various transformers since it constitutes more than 60% of

Source: Our survey

profitability, lacking professionalism, and operating in a parasitic manner. This factor seriously hampers the stability and growth of the industry.

- The prevalence of informal transactions within the cork industry: Poor security conditions, combined with a lack of forest surveillance, have led to the proliferation of informal networks that disrupt cork transactions. This phenomenon has reached such proportions that it has created genuine anxiety among the transformers.

the total cost of the final product and influences their purchasing decisions. The evaluation of the price level of cork by the transformers is presented in the table below.

Table 8.Evaluation of purchase price by transformers

Purchase Price	High	Average	Low
Frequency	9	0	0
Percentage	100%	---	---

Source: Our survey

The purchase prices of raw cork on the market are considered excessively high given the poor quality offered. Transformers highlight the

significant imbalance in the price-quality ratio of cork and emphasize the contradiction between the trend of declining cork quality and the upward



trend in prices proposed in auctions unrelated to the quality offered.

With the rising prices of cork, participation in public auctions, which are scheduled approximately every four months, has become irregular for most transformers, especially those with limited financial capacity.

Strategies for reorganizing the industry

The market distortion of cork is partly responsible for the lack of organization among transformation companies and the weaknesses observed in terms of management. However, the comprehensive diagnosis targeting transformers and stakeholders in the industry has allowed us to identify practices to be implemented to improve the performance of these companies and ensure sustainable exports. These practices include:

- Crevoisier 2007, improving the quality of finished products through investment in appropriate equipment to increase the value of manufactured goods.

- Developing a marketing culture through active coaching to successfully promote these products in the global and local markets.

- Adopting new communication approaches (internet, meetings, advertising, etc.) to facilitate marketing and reduce transaction costs.

- Strengthening the national interprofessional cork council to address profession-related issues (bank credit, upgrading, pricing, customs duties, taxes, etc.).

- Reclaiming the domestic market by assessing the actual demand and offering product ranges in line with market needs.

- Repurposing the activities of second transformation companies (waste valorization).

- Partial or total privatization of public units to increase profitability and reduce state involvement in production segments.

Increasing export volume also requires proven performance in the upstream (exploitation) and midstream (transformation) segments, as well as upgrading the export policy. This policy should meet the expectations of exporters, and the main actions to be implemented are:

- Implementing export assistance programs.

- Streamlining customs procedures to expedite the shipment of goods.

- Subjecting finished products to licensing for distribution.

- Establishing specialized centers for standardization, particularly for cork.

- Specializing ports and airports in regions with significant industrial clusters (such as the wilaya of Jijel) based on the nature of these clusters, to facilitate and minimize transportation costs.

CONCLUSIONS

This research aimed to address the key factors influencing the expansion of cork exports in Algeria. To achieve this, a strategic diagnosis of the transformation segment of the

cork industry was conducted through statistical data analysis, interviews, and a survey conducted in the Jijel province.

The first aspect we focused on was the disruptions and significant increase in exports of semi-finished products, along with the limited presence of cork products in the international market.

The diagnosis of the situation in the transformation segment allowed us to identify the main issues encountered, which are:

- Insufficiency of raw cork: The quantities offered by forest conservations are low, leading to inadequate supply for transformation units. Industrial transformation capacities far exceed the current supply from cork oak forests. The insufficiency of raw cork, in turn, can be attributed to other factors such as aging cork oak forests, diseases affecting them, repeated fires, low reforestation rates for degraded stands, lack of silvicultural maintenance work, and inadequate rationalization in cork exploitation, a renewable natural resource. The persistence of these factors has weakened cork oak stands and reduced the cork supply.

- Poor quality of cork offered in regulated markets: Evaluation of the harvested cork quality revealed its mediocrity. Consequently, the degradation of harvested cork quality has led to decreased economic profitability for transformation companies, the main players in the industry, as they produce lower-value

products compared to those of competitor countries.

- Lack of an established quality-to-price ratio based on supply and demand: The price proposed by the General Directorate of Forests does not align with the quality of the cork in question, thereby increasing production costs.

The development of the typology of surveyed transformers allowed us to stratify them into four groups. This classification was useful for determining the factors that contribute to success and continuity in exports, as well as the opposite. Key factors for success in cork product exports include operational capacity, revenue, range of transformed products, regularity in purchases scheduled by the General Directorate of Forests (DGF), experience, and the ability to assess cork quality. The difference in these variables determines the level of performance and competitiveness.

In general, low-performing companies are characterized by weaknesses in these variables and are unable to sustain competition from more efficient companies over an extended period.

In addition to the challenges related to raw materials, transformation companies face managerial and organizational weaknesses. The business environment and support services are inadequate and incomplete to make the market system efficient and support the growth and development of the industry. However, despite the

difficulties faced by these companies, the attractiveness of the cork industry remains a major asset because it has a comparative advantage, provided there is rational utilization of resources, proper utilization of knowledge and expertise, and both national and international financial means available for investment in transformation/exportation. It is through these efforts that the cork industry can build a competitive advantage

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APPENDIX

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Table A1 .Major Cork Exporters in Algeria

Exporter	Destination	Share in Total Exports (%)	Origin Province
SIBL	Portugal	28,64	Jijel
BOUCHONNERIE ALGIERS	Portugal	11,50	Jijel
EL WIAM	Italie- Espagne	11,18	Jijel
JIJEL LIEGE ETANCHEITE	Italie- France	7,26	Jijel
Etablissement BENSLIM	Espagne-France-Portugal	3,49	Alger
SIAL	Italiy	6,07	-
COLLOCORK	Espagne	4,04	Skikda
BOURENANE LARBI	Espagne	7,21	Jijel
Total Displayed		72,21	

Source : ALGEX, Dashboard of Algerian Exports to Europe, 2009

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