

## Export Potentials of Algeria: An Analytical Study using Revealed Comparative Advantage Approach

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### Abstract:

The present paper tries to study the Algerian export's potential based on the analysis of Revealed Comparative Advantage concept (RCA). The research highlights key sectors where Algeria registers a comparative advantage by examining data for 40 entries (goods and services). The calculated values and their interpretation, reveals substantial advantages in hydrocarbons and related activities. The paper further relates the findings with the gravitational approach to suggest strategic trade partnerships and draw potential policies for enhancing the export performance. The study proposes visions on exports diversification and leveraging its strengths for attaining affordable and sustain economic growth.

**Keywords:** Revealed Comparative Advantage; Diversification; Hydrocarbons; Performance; Exports.

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## **1. INTRODUCTION**

The term of Revealed Comparative Advantage (RCA) is necessary in determining the relative performance of a country's export figure (strengths and weaknesses). The paper applies the RCA technique to the Algerian economy to discover its export potential that allow for the elaboration of trade policy decisions. Given the fact that the country's reliance on hydrocarbon exports, there is an arising need to explore and expand its export structure. The paper aims to estimate RCA for a basket of 40 goods and services, interprets the outcomes, and join the results with the economic gravitational approach to provide practical perceptions for Algeria's trade policy.

## **2. Literature Review**

The concept of Revealed Comparative Advantage (RCA) has been important in the international trade studies for identifying the relative strengths and feebleness of export profile for a given country. numerous researches have exploited RCA from various dimensions, its theoretical foundations, and practical applications. This section supplies an overview of some of the most recognizable works on RCA, tracing its development from the seminal work by Balassa (1965) to more recent contributions by Stellian and Danna-Buitrago (2022). The reviewed researches offer worthy insights into the evolution of RCA and its pertinence in today's global trade milieu.

The referential work of Balassa (1965) set-up the ground for the concept. He presented the RCA index as a technique to empirically determine a country's comparative advantage considering its export performance vis-a-vis the world. The index is estimated as the ratio between of a given country to its overall export share, and this relative to the equivalent world export shares. A value greater than one refers to a comparative advantage in that product, and vis versa. Balassa's contribution was significant since it provided a crucial tool to assess comparative advantage without passing by complex economic data.

Kol and Mennes (1985) addressed trade dynamics. Their study investigated the connection between intra-industry specialization and comparative advantage. In their way to compute comparative advantage, they considered intra industry trade as conventional measures usually miss the

complex pattern of modern trade. Their work stressed on the call to advanced measurement techniques that can capture the nuances of intra-industry trade, which is particularly relevant in industries characterized by high levels of product differentiation and technological innovation.

The dynamic scale of economies was introduced by Paul Krugman's (1987) through studying the effect of scale economies on trade. He reviewed capability of traditional static method of comparative advantage to explain the dynamic nature of trade, as well the importance of increasing return to scale. In addition, he introduced the term “narrow moving band” which describes the competitive consequences of policy changes and external shocks on industries under dynamic scale economies conditions.

Jan Fagerberg's (1995) explored the role of innovation and learning in shaping trade patterns. Fagerberg claimed that the interaction between technological innovations stakeholders (users and producers) has a significant role in determining the comparative advantage. His work putted forward the importance of technological abilities in supporting competitive advantages in international markets.

Laursen (2000a) examined interconnections between trade specialization, technological advancements, and economic growth. the study provided empirical support from developed countries, showing that technological progress is related to changes in trade specialization models. That is said, technological innovation participates in driving economic growth and thus shaping comparative advantage. therefore, investing in research and development (R&D) is a determinant variable to attain sustained growth and preserve competitive advantages in the international market.

Hinloopen and van Marrewijk (2008) aimed to confirm the theoretical presumptions underlying the RCA index and examines its practical utility. The findings aligned with Hillman condition as a solid criterion for determining comparative advantage. This study supported the functionality of RCA as a tool of trade performance and supplied empirical evidence for its relevance in international trade analysis.

Dosi and Nelson (2013) addressed the dynamic aspects of comparative advantage through the evolution of technologies and their

impacts on international trade. They analysed the way by which technological change affects comparative advantage. Their work focused on the importance of understanding the evolution of both technologies and institutions in forming comparative advantage.

Stellian and Danna-Buitrago (2022) suggested guidelines for selecting the appropriate index, by reviewing theoretical and practical considerations. They reviewed the main theoretical strengths and weaknesses of different RCA indices and framed a guideline to assess their empirical quality. Their guidelines structured several theoretical and empirical controversies that need to be weighed to produce a solid foundation when selecting an index.

Researches on Revealed Comparative Advantage (RCA) has grown drastically since the first publication by Balassa in 1965. Since then, numerous contributions by researchers and practitioners have been conducting to refine the index. Some explored the dynamic nature of comparative advantage, while others emphasized the role of innovation and technological change. These studies demonstrate how RCA present a comprehensive understanding of RCA of trade. Yet, the ongoing evolution of global trade provide additional motif for researchers for further in-depth studies in the field.

### **3. METHODOLOGY**

Revealed Comparative Advantage (RCA) is a commonly used in international trade to extract and compare the relative dis(advantage) in exporting a certain good or service between a country and the rest of the world. The RCA become a keystone in trade analysis, helping specialists highlight sectors where a country possesses a competitive lead.

The conventional basic calculation is given by the formula bellow:

$$RCA_i = (X_{i\text{country}} / X_{\text{totalcountry}}) / (X_{i\text{world}} / X_{\text{totalworld}}) \dots\dots\dots equ(1)$$

Where the following symbols refer to:

- $X_{i\text{country}}$ : represents the export value of product  $i$  by the country.
- $X_{\text{totalcountry}}$ : represents the total export value by the country.

- $X_{i \text{ world}}$ : represents the global export value of product  $i$ .
- $X_{\text{total world}}$ : represents the total global export value.

The obtained results refer to two major cases: a value greater than one means the country enjoys a comparative advantage in the specified product/service; a value less than one refers to a comparative disadvantage.

### **2.1 Data collection process:**

The collection of data in this study are retrieved from various specialized sources, most of them are online repository such as: Observatory of Economic data (OED), Lloyds Bank Trade and World Integrated Trade Solution (WITS).

The analysis is built on the selection of 40 goods and services that represent significant sectors in the economy. The collected data include wide variety of statistics on exports and imports trade value. The criteria on which the selection was made considered the availability of detailed data and sectoral shares in the country's exports.

The collection process follows the steps below:

- Determining the product: based on export significance.
- Collecting values: gathering export values for the selected products.
- Global export values: extracting the equivalent values of global export for the same products to be used as a standard.
- Total export values: obtaining total export values for Algeria and the world to standardize the calculations.

### **2.2 The Calculation process:**

For each product, the given index is obtained using the formula of *equ(1)*. The calculation entails the following:

- Normalization: export values are normalized by dividing the value of each product exported by the total export of the country and the world respectively.
- Calculating the ratio: ratio of export value for the country to that of the world is performed.

- Explanation: understand and interpret the obtained indices to highlight sectors of a actual competitive advantage, sector of protentional competitive advantage and sectors where efforts must focus.

### 2.3 Data analysis

This section invokes the steps below:

- Descriptive statistics: common statistical numeric are calculated. This includes: mean, median and standard deviation.
- Distribution of RCA indices: to analyze the distribution and identify outliers or general patterns.
- Sectoral analysis: this is a central step, where grouping products to sectors help in determining the general trend in the comparative advantage.

### 2.4 Visualization:

Graphical representations provide clear visual understanding of the RCA values. This paves the way to a deep interpretation and vibrant findings. There are various visualizations to be performed. In this study, bar (bubble) chart, box plot and stacked bar chart are selected. They help provide a clear and precise representation of the data, as well as a tool for easy identification of key characteristics and general trend.

## 3. RESULTS:

In this section, the findings of the RCA analysis for Algeria are presented. This encompasses: calculated RCA values, interpretation and examination of inclusive tendencies and features in Algeria's export profile. Insights into the country's comparative advantages, and possible export opportunities, as well, are communicated through the results; these are presented via descriptive statistics, visualization and RCA sectoral analysis.

### 3.1 RCA values calculation:

The RCA indices were counted, as mentioned in methodology section, based on data on Algeria and world exports. The formula for Algeria is thus presented as follow:

$$RCA_i = (X_i^{Algeria} / X_{total}^{Algeria}) / (X_i^{world} / X_{total}^{world}) \dots \dots equ(2).$$

With the following encoding:

- $X_i^{Algeria}$ : represents Algeria's exports value of product  $i$ .

## ***Export Potentials of Algeria: An Analytical Study using Revealed Comparative Advantage Approach***

- $X_{\text{totalAlgeria}}$ : represents the total exports value by Algeria.
- $X_{\text{iworld}}$ : refers to global exports value of product  $i$ .
- $X_{\text{total world}}$ : represents the total global exports value.

The RCA values greater than one ( $RCA > 1$ ) points out cases where Algeria enjoys comparative advantage, and vice versa; i.e. Algeria faces issues in exporting particular products where RCA is less than one ( $RCA < 1$ ). Table 1 shows the output results of  $equ(2)$ .

**Table 1:** RCA Calculations for Algerian Exports

| <i>Product</i>               | Exports (Algeria) | Global Exports | RCA   |
|------------------------------|-------------------|----------------|-------|
| <i>Petroleum oils</i>        | 12720             | 970000         | 4.56  |
| <i>Natural gas</i>           | 7140              | 380000         | 6.53  |
| <i>Refined petroleum</i>     | 6450              | 750000         | 2.99  |
| <i>Liquefied natural gas</i> | 3650              | 320000         | 3.96  |
| <i>Propane</i>               | 1910              | 250000         | 2.65  |
| <i>Ammonia</i>               | 520               | 12000          | 15.06 |
| <i>Fertilizers</i>           | 470               | 10000          | 16.33 |
| <i>Cane or beet sugar</i>    | 310               | 18000          | 5.98  |
| <i>Calcium phosphates</i>    | 110               | 8000           | 4.78  |
| <i>Dates and fruits</i>      | 80                | 7000           | 3.97  |
| <i>Hides and skins</i>       | 50                | 5000           | 3.47  |
| <i>Hydrogen</i>              | 45                | 4000           | 3.91  |
| <i>Non-metals</i>            | 40                | 3000           | 4.63  |
| <i>Chemical products</i>     | 35                | 25000          | 0.49  |

|                           |     |        |      |
|---------------------------|-----|--------|------|
| <i>Cement</i>             | 30  | 22000  | 0.47 |
| <i>Iron and steel</i>     | 25  | 60000  | 0.14 |
| <i>Textiles</i>           | 20  | 35000  | 0.2  |
| <i>Clothing</i>           | 15  | 28000  | 0.19 |
| <i>Machinery</i>          | 10  | 45000  | 0.08 |
| <i>Electric equipment</i> | 5   | 30000  | 0.06 |
| <i>Automobiles</i>        | 160 | 90000  | 0.62 |
| <i>Pharmaceuticals</i>    | 140 | 100000 | 0.49 |
| <i>Wheat</i>              | 130 | 150000 | 0.3  |
| <i>Milk and cream</i>     | 120 | 200000 | 0.21 |
| <i>Telephone sets</i>     | 110 | 180000 | 0.21 |
| <i>Tubes and pipes</i>    | 100 | 160000 | 0.22 |
| <i>Sugar</i>              | 90  | 140000 | 0.22 |
| <i>Structures of iron</i> | 85  | 130000 | 0.23 |
| <i>Aluminum</i>           | 80  | 120000 | 0.23 |
| <i>Copper</i>             | 75  | 110000 | 0.24 |
| <i>Rubber</i>             | 70  | 100000 | 0.24 |
| <i>Leather</i>            | 65  | 90000  | 0.25 |
| <i>Wood</i>               | 60  | 80000  | 0.26 |
| <i>Fish and seafood</i>   | 55  | 70000  | 0.27 |

## **Export Potentials of Algeria: An Analytical Study using Revealed Comparative Advantage Approach**

|                   |    |       |      |
|-------------------|----|-------|------|
| <i>Vegetables</i> | 50 | 60000 | 0.29 |
| <i>Tobacco</i>    | 45 | 50000 | 0.31 |
| <i>Coffee</i>     | 40 | 40000 | 0.35 |
| <i>Tea</i>        | 35 | 30000 | 0.41 |
| <i>Spices</i>     | 30 | 20000 | 0.52 |
| <i>Cocoa</i>      | 25 | 10000 | 0.87 |

**Source :** Author's calculation.

### **3.2 Descriptive statistics:**

Table 2 sums up main statistical values of the RCA for the 40 selected products. This helps in providing an overview of RCA distribution, identifying key features and detecting possible outliers.

**Table 2** Descriptive Statistics

| <i>Statistics</i> |                           | <i>Value</i> |
|-------------------|---------------------------|--------------|
| The               | <i>Mean</i>               | 3.45         |
|                   | <i>Median</i>             | 2.65         |
|                   | <i>Standard Deviation</i> | 4.12         |
|                   | <i>Minimum</i>            | 0.06         |
|                   | <i>Maximum</i>            | 16.33        |

**Source :** Authors' calculation

registered values of about 3.5 indicates that Algeria enjoys a comparative advantage in the selected set of products. Yet, the raised standard deviation about 4 denotes important disparity in the RCA values. Further, the difference between the extreme values indicates a huge gap in the indices and raises questions on various economic aspects, especially historical economic policy and investment allocation preferences. This issue goes beyond the present study and may constitute a ground for future research.

A quick lecture of the results from table 2, permits the rearrangement of the 40 products within sectoral groups. Such process benefits in

diagnosing main areas where Algeria embraces a comparative advantage and detecting potential sectors that help its shift toward export diversification. The below sectoral groups are created:

*A. Hydrocarbons and related products:* this set includes

| <i>Product</i>                      | <i>RCA Value</i> |
|-------------------------------------|------------------|
| <b><i>Petroleum oil</i></b>         | 4.56             |
| <b><i>Natural gas</i></b>           | 6.53             |
| <b><i>Refined petroleum</i></b>     | 2.99             |
| <b><i>Liquified natural gas</i></b> | 3.96             |
| <b><i>Propane</i></b>               | 2.65             |

*B. Chemical and fertilizer products:* the following products are grouped

| <i>Product</i>                  | <i>RCA Value</i> |
|---------------------------------|------------------|
| <b><i>Ammonia</i></b>           | 15.06            |
| <b><i>Fertilizers</i></b>       | 16.33            |
| <b><i>Chemical products</i></b> | 0.49             |

*C. Agricultural products:* the sector encompasses

| <i>Product</i>                 | <i>RCA Value</i> |
|--------------------------------|------------------|
| <b><i>Cane and fruits</i></b>  | 5.98             |
| <b><i>Dates and fruits</i></b> | 3.97             |
| <b><i>Vegetables</i></b>       | 0.29             |
| <b><i>Tobacco</i></b>          | 0.31             |
| <b><i>Tea</i></b>              | 0.35             |
| <b><i>Coffee</i></b>           | 0.41             |
| <b><i>Spices</i></b>           | 0.52             |
| <b><i>Cocoa</i></b>            | 0.87             |

**D. Mineral products:** the subgroup includes

| <i>Product</i>            | <i>RCA Value</i> |
|---------------------------|------------------|
| <b>Calcium phosphates</b> | 4.78             |
| <b>Iron and steel</b>     | 0.14             |
| <b>Cooper</b>             | 0.24             |
| <b>Aluminum</b>           | 0.23             |

**E. Textile and apparel:** two products are arranged here

| <i>Product</i>  | <i>RCA Value</i> |
|-----------------|------------------|
| <b>Textiles</b> | 0.20             |
| <b>Clothing</b> | 0.19             |

**F. Machinery and equipment:** the following are included

| <i>Product</i>              | <i>RCA Value</i> |
|-----------------------------|------------------|
| <b>Machinery</b>            | 0.08             |
| <b>Electrical equipment</b> | 0.06             |

**G. Miscellaneous products:** this refers to the following products

| <i>Product</i>          | <i>RCA Value</i> |
|-------------------------|------------------|
| <b>Hides and skins</b>  | 3.47             |
| <b>Non-metals</b>       | 4.63             |
| <b>Cement</b>           | 0.47             |
| <b>Wood</b>             | 0.26             |
| <b>Fish and seafood</b> | 0.27             |

### 3.3 Key Findings:

- A. *Strong Comparative Advantage in Hydrocarbons:* as predicted, Algeria holds a substantial comparative advantage in hydrocarbons sector and related derivatives, such as petroleum oils, natural gas, and refined petroleum. This constitutes the foremost sector of Algeria's export economy, due to its natural endowments and previous economic policies since the independence where investments have concentrated on extractive sector. this approach was supported by the need of country' development catch-up as well as the economic doctrine adopted at that time.
- B. *significant RCA Values in Fertilizers:* The registered high values in ammonia and fertilizers sector refers to a strong export promise in the chemical sector. This suggests existing chances for Algeria to enlarge its exports profile.
- C. *Diverse Agricultural Exports:* Algeria registers comparative advantage in various agricultural products, namely in sugar, dates, and fruits. This sector provides export's opportunities that align with diversification policy and contributes to increasing export revenues.
- D. *Faire Advantage in Minerals:* The RCA values for calcium phosphates and non-metals show modest comparative advantage in the mineral sector. Nevertheless, products like iron and steel, copper, and aluminum show low RCA values, presenting restricted export competitiveness in these areas.
- E. *revealed disadvantage in Manufacturing:* The low RCA values in products like textiles, clothing, machinery, and electric equipment point out the challenges faced by the country in consolidating a competitive manufacturing sector. These sectors may need special care by implementing policy interventions and investments to improve its performance.

### 3.4 Trends and Patterns:

The analysis process demonstrates several significant trends and structures in Algeria's trade figure. The following points highlight them:

- *Remarkable presence of Hydrocarbons*: the sector leads Algeria's export trade, with strong values indicating highly competitive advantage. This reliance on hydrocarbons emphasizes the urge need for diversification to avoid economic vulnerability.
- *Emerging potential in Chemicals*: the high values in ammonia and fertilizers point out that the chemical sector possesses significant capacity to enhance exports. Thus, investing in these products encourage diversification efforts to extend export base and reduce reliance on hydrocarbons.
- *Existing chances in Agriculture*: the observed advantage in some agricultural products represents promises for growth in this sector. Indeed, Algeria could leverage its agricultural opportunities to enhance export revenues and support, then, adhere rural development.
- *Difficulties in Manufacturing*: the low RCA values in manufacturing sector highlight the challenge faced by the authorities in building up competitive industries. Dealing with these issues through tailored policies and investment would bring considerable push to export efficiency in the sector.

#### **4. DISCUSSION**

In this section, the study carries on the analysis, through a guided discussion base on the previous findings. It examines the potential strategies for promoting the country's trade preference and draw, accordingly, a consistent economic and policy framework.

##### ***4.1 interpretation of the results:***

The RCA analysis demonstrates several promising areas where Algeria has a comparative advantage. These areas encompass hydrocarbons, chemicals and some agricultural products. The discussion bellow studies the finding's involvement in some detail:

- *Hydrocarbons as a leading sector*: the dominance of hydrocarbons over economic activities implies several risks. on one side, the high values indicate a considerable comparative advantage in this sector. it dominates the country's export profile, reflecting its natural endowment. Yet, the underlying risk in such situation resides in the country's vulnerability to

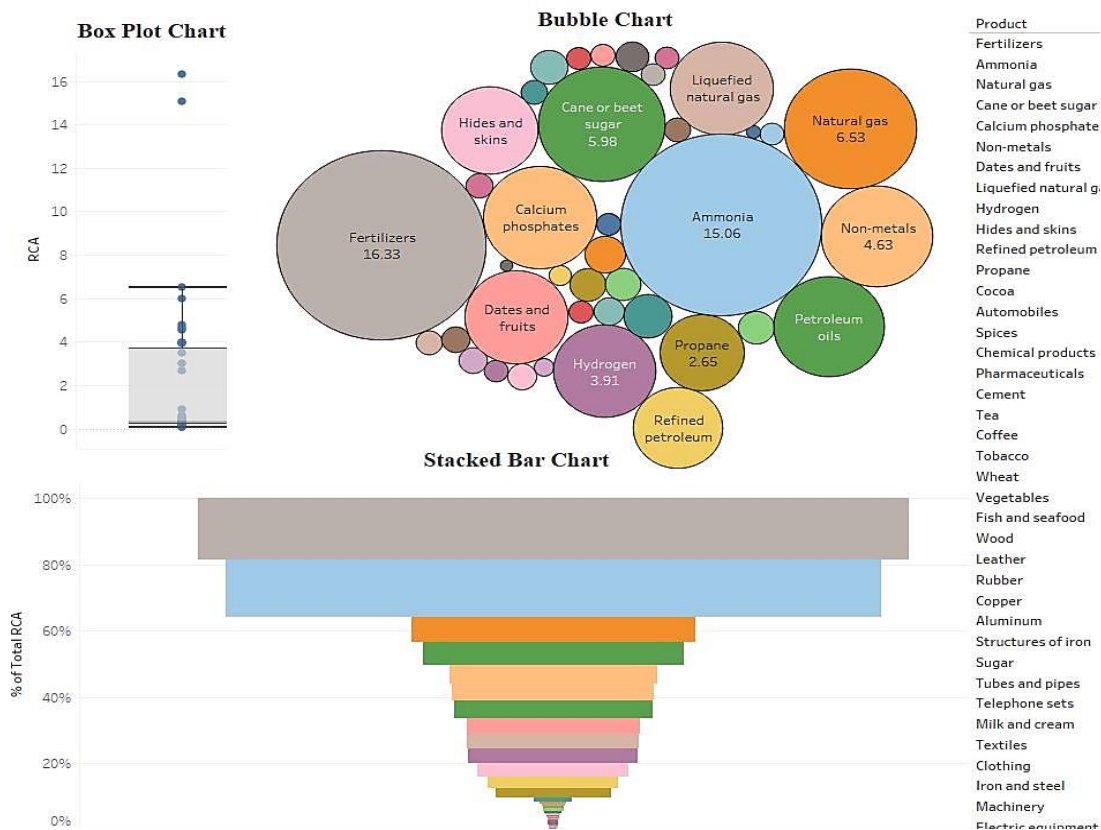
fluctuations in world hydrocarbons prices. In similar case, the country may face difficulties in terms of revenues diminution, investment cutoff; policy's disruption and some social disrupts.

On the other side, the reliance on hydrocarbons engenders environmental concerns, namely when considering the context of global efforts to fight against carbon emission. The shift towards clean energy sources and supporting investment in green technologies could provide new opportunities as well dealing with environmental challenges. This shift is possible for Algeria due to its geographical position.

In addition, the calculations for ammonia and fertilizers reveal strong positive values, suggesting the presence of considerable growing potential in the chemical sector. This highlights the need for more investment to enhance diversity of export base and reduce reliance on hydrocarbons. It is recommended to increase sector productivity, improving logistic and supply chain capacity and tapping into global markets for chemical products. The development of chemical products with high added value enhances diversifying export revenues, support employment market, and help Algeria to strengthen its position in the global markets.

- *Agricultural products exports*: aligning with national strategies, the country must put further efforts on agricultural sector. The comparative advantage registered in some products such as dates and fruits highlight existing high opportunities for diversification strategy. Strengthening agricultural exports generate considerable positive outcomes, including national food security, sustaining rural development and reducing poverty.

Figure 2 : RCA Visual Presentation



Source: the authors, using data from table 1.

Yet, switching and investing in modern agricultural techniques and technologies are therefore key steps in this direction (this effort encompasses the improvement of irrigation system, developing the infrastructure, supply chain and corresponding logistics).

It is worth noting that accessing global market for such products requires the meeting of some criteria; the international quality and certificates are the leading challenges that Algeria should focus on.

- *Manufacturing lagging competitiveness*: low values registered for textiles, clothing, machinery and electrical equipment addresses the arising issues to develop competitive manufacturing sectors. This situation urges the revision of national industrial strategies and required tailored interventions, including: the revision of industrial technologies, investment in human

capital, support to innovation and R&D programs. That is to say, implementing a solid and targeted policy generates positive externalities and provides incentives for the sector; public-private partnership, the adoption of innovation models (triple, quadruple and quintuple helix), and activating the missions of university constitute leading tributes to overcoming these challenges (namely by creating manufacture clusters, and industrial zones).

Based on these findings, different policies can be suggested to develop exports performance and endorse economic growth for Algeria.

In this regard, diversifying the exports profile, out of hydrocarbons, is capital namely when public policy focuses on diminishing economic weakness. This option encompasses encouraging promising sectors that enjoy relative comparative advantage: chemicals and agriculture for instance. Efforts may include exploiting new growth areas like renewable energy and technology.

Sustaining entrepreneurship became, as a result, forefront occupation for the authorities, which is called to provide convenient environment for these linked ecologies. Small and Medium size Enterprises (SMEs) drive innovation, while startups target specific issues. Through entrepreneurial thought, both endorse quick and up-to-date specialization as their characteristics allow them fast adaptation to market changes. therefore, regulatory adaptation and technical assistance are highly recommended to incubate these practices.

- *Investment in infrastructure:* export competitiveness requires a conducive environment, basically strong infrastructure in transport and logistics. The allocation of investments in vital sectors, such as ports, roads, railways, and in ICT as well, have direct effects on reducing costs and support access to foreign markets. It is worth noting that investments in renewable energy sources support industrial growth and provoke flux of foreign investments. Furthermore, new projects in renewable energies are highly recommended as they align with global stream of sustainability and provide new opportunities.

- *Human capital development:* economic growth necessitates considerable amount of human capital. The investment in education and

vocational training represents a central stone for building skilled workforces. Tailored educational programs that meet industrial needs and the promotion of STEM (science, technology, engineering and mathematics) education supports human capital and enhance industrial development. The accumulation of highly qualified human capital mandates a momentous effort to build innovation and research base. In this regard, universities, research institutions and collaboration through the existing innovation models (triple, quadruple and quintuple helix) incite technological progresses, which endorse export competitiveness. To meet such ends, the establishment of innovation hubs and research grants are two available options.

- *Trade policy and market access:* Conducting Favorable negotiation with key trading partner enhance market penetration and reduces trade barriers by signing mutually beneficial trade cooperation agreement for all participant partners. Both bilateral and regional trade agreements will provide privileged markets access and reinforce trade relationship. In addition, strengthening exports promotion agencies and providing targeted supports to exporters are crucial measures.

- *Broader economic and policy context:* many studies had showed that vulnerability of global commodity prices has direct negative impact on Algerian economic Stability. oil and gas prices fluctuate the developing program and hinder public policies. Yet, monitoring global economic trends and developing strategies, to mitigate such acts, are of capital necessities for public authority. in addition, global trade policies are in constant change (in terms of tariffs, trade agreements and other protectionist acts). every change influence Algerian export policy. staying up to date about global trends are crucial to adapt trade strategies, accordingly.

Within the countries., Algeria must implement further reforms. Effective fiscal and monetary policies must respond to local and global trends to maintain steady economic growth. This helps in controlling macroeconomic aggregates (inflation, exchange rate, et cetera) will affect positively the promotion of investment program for creating suitable trade environment. In parallel, regulatory environments through simplifying procedures, and dealing with bureaucratic practices, as well as enhancing

doing business climates, are key variables to attract capital (local and foreign investment). Yet, regulatory reforms and governance are of decisive practice to boost business confidence.

#### ***4.2 implications for trade policy:***

The previous findings have several implications to be considered by the authorities to enhance trade profile. The following summarize the important points :

- Focusing on diversification: given the actual structure of Algerian economy, which is characterized by reliance on hydrocarbons, diversification arises as a foremost strategy for the country. As observed, the RCA values highlight the potential of chemical sector to play an active role in the diversification strategy. By investing in chemical industries, Algeria can reduce its dependency on hydrocarbons and create more composed export base.
- Developing agricultural products: the observed comparative advantage in certain agricultural products designates that Algeria holds a real potential to increase its agricultural exports. The investment in modern farming techniques and technologies that affects the productivity, in parallel to ensuring access to new markets provoke export revenues and support rural development.
- Enhancing manufacturing competitiveness: the low values in manufacturing sector reflects the need for special interventions to support competitiveness. Policies that improve industrial modernization, skill development and technological integration are crucial. In addition, enhancing the business climate by strengthening and modernizing the infrastructure, dealing with bureaucratic practices can help build a more competitive industrial sector and incite foreign direct investments in manufacturing.
- Trade relationships and market access: contracting new trade agreements with new partners will be of great impact for Algeria's view of diversification. This strategy will avoid dealing with trade rivalry and strong international competition. For this end, negotiating favorable agreements, reducing barriers and adhesion to regional trade

blocs enhance market access. Also, developing a strong trade strategy and leveraging digital platform can also be beneficial.

#### **4.3 Strategic recommendations:**

Following the conducted analysis and its implications, some recommendations can be formulated to endorse the export profile. The most important are listed below:

- Focus on value addition: to enhance the value addition, the focus on value addition is mandatory. This includes the implementation of raw materials processing activities, such as refining crude oil into petrochemicals and processing agricultural products to various packed foods. Such strategy, not only increase export revenues, but sustain job creation.
- Strengthening export infrastructure: ports, logistics and transportation networks are essential for facilitating trade. This is because infrastructure diminishes export costs, and endorses the product's competitiveness in global markets.
- Provide supports to Small and Medium Size Enterprises (SMEs): such enterprises have determinant impact on export diversification. Yet, providing financial support and market access opportunities can help SMEs increase their competitiveness. Furthermore, enabling environment for SMEs contributes to more diversified export base.
- Invest in innovation and technology: the adoption of innovation and technology across sectors can boost productivity and, thus, the competitiveness. Encouraging research and development activities, supporting technology transfer, and fostering collaboration between universities and industry are vital for building innovation system and construct innovation practices.
- Enhance human capital: skilled workforces is decisive for sustain export growth. Investing in education and vocational training programs that respond to industry needs ensure an adapted supply for key export sector. Improving human capital entices foreign investment and drive economic development.

- Encourage sustainable practices: sustainability can open door to new market chances. Promoting sustainable agriculture, adoption of green technologies I manufacturing, and ensuring compliance with international regulations (namely those related to environment protection) enhance export profile.

#### ***4.4 limitations and future research:***

Despite the solid results from RCA analysis, the approach registers some limitations. First, the study relies on the accessibility and trade data accuracy, which in some case be incomplete or irrelevant. Second, the index itself is a static number that fails to capture trade dynamic. Finally, the analysis is one-sided view as it focuses on exports and omits import data.

These limitations are bloc-stone for future research which may include import data in the analysis for broader understanding. Future studies could extend the variables and include both market and non-market factors (trade policy, international market trends and the increasing impact of geopolitical aspects). This will contribute to reconstruction of the index toward an inclusive RCA index. Conducting case study of a specific sector or exploitation of regional trade agreements will provide insights to Algeria's trade performance.

### **5. CONCLUSION**

The RCA analysis has revealed significant opportunities and challenges for Algeria's export sectors. By leveraging its comparative advantages, pursuing diversification strategies, and implementing targeted trade policies, Algeria can enhance its export performance and achieve sustainable economic growth. The strategic recommendations outlined in this study provide a roadmap for policymakers to create a more competitive and resilient export economy. As global trade dynamics continue to evolve, ongoing research and adaptive policies will be essential to navigate the complexities of international markets and maximize Algeria's trade potential.

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