

**Logistics innovation and Big Data in Colombian foreign trade**

Laudy Tatiana Álvarez Vargas

Yenifer Rodríguez Pabón

Adviser

Carlos Humberto Gualdrón García

Universidad Nacional Abierta y a Distancia UNAD

School of Administrative, Accounting, Economic and Business Sciences ECACEN

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### **Abstract**

This project involves the design and analysis of the international supply chain for the Colombian company ColExport Valor S.A.S., a micro, small, and medium sized Enterprise (MSME) focused on the FOB marketing and export of high value industrial and technological products to the United States. Using Big Data tools and analysis of foreign trade databases, the highest value-added products and markets with the greatest purchasing power were identified, allowing for the definition of export strategies based on units rather than profit volume. The document describes the structure of the national and international supply chains, including logistics participants, suppliers, transportation, port operations, and customs processes. A comparative analysis with national competitors is also conducted, highlighting the company's competitive advantage, particularly its use of data analytics for strategic decision making. Finally, a five-year financial forecast was developed demonstrating the project's viability with sustainable revenue growth, a return on initial investment, and an internal rate of return of approximately 32%. Overall, the project demonstrates that integrating logistics, data analysis, and financial planning allows us to build efficient and competitive international supply chains.

**Keywords:** Big Data Analytics; Export Strategy; Financial Projection; International Supply Chain; Micro, Small and Medium-Sized Enterprises (MSMEs).

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## Introduction

The development of international trade has increasingly required companies to adopt data-driven strategies in order to reduce risks and improve profitability (Maheshwari et al., 2021). In this context, Micro, Small and Medium-sized Enterprises (MSMEs) play a key role in strengthening national exports by focusing on high value-added products and strategic international markets (Campbell, 2024). This project presents the international supply chain and financial feasibility of ColExport Valor S.A.S., a Colombian MSME specialized in the commercialization and export of industrial and technological products with high FOB value, using data analysis and Big Data tools to support decision-making and market selection, particularly toward the United States (Yajing Lu et al., 2024).

This project corresponds to Phase 5 of the Diploma in Logistics and Big Data and builds upon the results obtained in Phase 4, where Big Data tools were used to identify high-value export products and target markets (Kopec et al., 2022). Based on this analysis, the present phase focuses on the design of the national and international supply chain for the MSME ColExport Valor S.A.S., as well as the development of a five-year financial projection to evaluate the feasibility and profitability of the project (Avagyan et al., 2022).

Through the integration of logistics planning and financial analysis, this phase aims to demonstrate how data-driven decision-making contributes to the successful construction of an international supply chain (Horvat et al., 2024).

### **Justification**

This project is justified by the need for Colombian MSMEs to increase their participation in international trade through data driven strategies that reduce risk and increase profits (Maheshwari et al., 2021). Analysis of databases and charts shows that the Americas, especially the United States, have high FOB values and high demand for industrial and technological products, providing significant business opportunities.

Furthermore, the selection of high value-added products is based on identifying items with higher FOB values, allowing the strategy to focus on markets with greater purchasing power and better unit export prices (Yajing Lu et al., 2024). This was supported by the establishment of ColExport Valor S.A.S., a company focused on maximizing profits through the export of high-value goods and the use of technological tools for decision making (Santos & Costa, 2020).

Similarly, building an organized international supply chain and developing financial forecasts can assess the long-term viability of a project, demonstrating that the integration of logistics, big data, and financial analysis is essential to improving the competitiveness of SMEs in the global market (Avagyan et al., 2022).

## **Objectives**

### **General Objective**

To design and analyze the international supply chain and financial viability of ColExport Valor S.A.S. as a Colombian MSME focused on exporting high FOB value industrial and technological products to the United States, supported by data analysis and strategic market selection.

### **Specific Objectives**

To identify and structure the international supply chain of ColExport Valor S.A.S., detailing the main stages, actors, and responsibilities involved in the export process from Colombia to the United States.

To evaluate the economic and financial feasibility of the project through a five-year financial projection, including income statement, balance sheet, cash flow, and internal rate of return.

To justify the selection of the United States as the target export market based on FOB value analysis, purchasing power, and trade dynamics reflected in the analyzed data.

To highlight the competitive advantages of ColExport Valor S.A.S. compared to national competitors, emphasizing the use of Big Data and export analytics as a key differentiating factor.

## **Content of the Work: Logistics Chains MIPYME ColExport Valor S.A.S**

### **Company Name**

ColExport Valor S.A.S.

### **Type of Company**

Colombian microenterprise (MSME) focused on export activities.

### **Economic Activity**

Commercialization and export of high FOB value products, mainly industrial and manufactured goods with strong international demand, identified through data analysis of foreign trade information.

### **Main Product**

Products classified within tariff chapters with the highest FOB value, especially industrial machinery and equipment, electrical and technological devices, high value-added manufactured goods.

(This selection is directly supported by the graph showing the Top 5 Tariff Chapters by FOB Value.)

### **Justification of the Company Based on the Graphs**

The creation of ColExport Valor S.A.S. is justified based on the analysis of the database carried out in Google Colab and the graphical visualizations obtained (Google Colab, 2024; Llerena et al., 2024). The graphs show that the American continent concentrates the highest total FOB value, indicating a high volume of exports and strong trade dynamics in this region.

Additionally, the analysis of the average FOB unit price by continent reveals significant differences among destination markets, demonstrating that certain regions offer

better commercial opportunities in terms of profitability. This behavior supports the company's strategy of focusing on markets with greater purchasing power and higher value per exported unit (Yajing Lu et al., 2024). Furthermore, the graph of the Top 5 tariff chapters by FOB value shows that industrial and technological products account for the highest export values, justifying the company's focus on goods with high added value. In this way, ColExport Valor S.A.S. positions itself as an MSME that uses data analysis and Big Data tools to support strategic decision-making, reduce risks, and maximize opportunities in international trade (Maheshwari et al., 2021).

### **Destination Country (linked to the graphs): United States (American continent)**

**Brief Justification.** Highest total FOB value according to the graphs, High demand for industrial and manufactured goods, Competitive unit prices Strong trade relationship with Colombia

### **Benchmarking of National Competition**

**Enoline International.** Activity: Import, export, and manufacturing of industrial machinery and automation solutions. Strengths: Broad portfolio of industrial machinery, experience in international trade, and in-house equipment manufacturing. Weaknesses: More traditional market and product focus, with limited use of advanced data analytics tools for export decision-making.

**Intetrade S.A.S.** Activity: Commercialization and import of machinery, equipment, and technological solutions for manufacturing and packaging industries. Strengths: Diverse supply of technological equipment, participation in international trade fairs, and strong relationships with global suppliers. Weaknesses: Not exclusively specialized in exporting high FOB value products; its main focus is importation and domestic commercialization.

**JJ Import-Export S.A.S.** Activity: Colombian company specialized in the import and export of heavy machinery, medical equipment, and recreational vehicles, with an international supplier network. Strengths: Integrated logistics capacity and international supplier network, facilitating access to multiple foreign markets. Weaknesses: Broad and diversified product portfolio, not focused specifically on high value-added industrial and technological goods.

**Importarex S.A.S.** Activity: Import and commercialization of machinery for various productive sectors, including industry and food processing. Strengths: Strong local market experience, technical support services, and competitive pricing strategies. Weaknesses: The company is not primarily focused on exporting Colombian high value-added products; its main activity is importation and distribution.

**Table 1**

*Comparative Analysis*

Criteria	ColExport Valor S.A.S.	National Competitors
<b>Market strategy</b>	Data-driven, based on FOB value analysis by destination	Experience-based and traditional
<b>Products</b>	High FOB value industrial and technological goods	General machinery and equipment
<b>Use of Big Data and export analytics</b>	Yes (key competitive advantage)	Limited or nonexistent
<b>International export orientation</b>	Direct and market-focused	Partial or secondary
<b>Profitability per unit</b>	High, based on FOB unit value	Variable, often focused on volume

*Note.* Own elaboration based on foreign trade database analysis and graphical results generated in Google

Colab (Google Colab, 2024; Llerena-Izquierdo et al., 2024).

### **Competitive Advantages of Colexport Valor S.A.S.**

ColExport Valor S.A.S. differentiates itself from national competitors through a data-driven export strategy, supported by foreign trade database analysis and graphical visualizations. Unlike traditional exporters, the company prioritizes markets with higher purchasing power and higher FOB unit prices, particularly the United States, as identified in the analyzed graphs (Horvat et al., 2024). **Strategic Impact.** This approach allows the company to reduce commercial and market risks, maximize profitability per exported unit, and focus on high value-added products rather than export volume.

### **National Marketing Chain: ColExport Valor S.A.S. – Colombia**

#### **Figure 1**

*Consolidated Diagram of the National Marketing Chain of ColExport Valor S.A.S.*



*Nota.* Own elaboration based on the proposed national logistics structure of ColExport Valor S.A.S.

#### ***Strategic Operating Hub***

ColExport Valor S.A.S. operates from Bogotá, which functions as the strategic coordination hub of the national commercialization chain. From this location, the company manages supplier relationships, logistics planning, transportation contracting, cargo

consolidation, and delivery to Colombian ports for export.

The company does not manufacture products; instead, it acts as a commercial and logistics integrator, connecting national industrial suppliers with international markets.

**Table 2**

*Consolidated National Commercialization Chain*

Stage	Actor	Location	Main Function
Production	National suppliers (HACEB S.A., Industrias Haceb, Incolmos Yamaha)	Medellín, Antioquia, Valle del Cauca	Manufacturing of industrial machinery, technological equipment, and high value- added goods
	Commercial coordination	ColExport Valor S.A.S. Bogotá	Supplier negotiation, quality verification, commercial management, and logistics planning
National transportation	Coordinadora Mercantil, TCC, Transportes Vigía	Nationwide	Collection and road transportation of industrial cargo
Cargo consolidation	Logistics operator / ColExport Valor S.A.S.	Bogotá	Packaging, labeling, grouping of cargo, and preparation of export documentation
Port operations	Port operators and customs agents	Cartagena / Buenaventura	Handling, storage, and dispatch of export cargo
End of national chain	ColExport Valor S.A.S.	Port coordination	Supervision of final delivery and transition to international supply chain

*Note.* Own elaboration based on the proposed national logistics structure of ColExport Valor S.A.S.

**Figure 2***Consolidated Diagram – National Marketing Chain*

*Note.* Own elaboration based on the designed national logistics structure of ColExport Valor S.A.S.

**International Supply Chain***ColExport Valor S.A.S. – Export to the United States*

ColExport Valor S.A.S.'s international supply chain begins once the industrial and technological products have been consolidated and shipped from the selected Colombian port (primarily Cartagena or Buenaventura, depending on the type of cargo and final destination in the United States). The company acts as a logistics and commercial integrator, coordinating the documentation, customs, and international transportation processes, without intervening in the product manufacturing.

The first link in the international chain corresponds to export customs management in Colombia, where the export declaration, tariff classification, regulatory compliance verification, and contracting of the international logistics operator are carried out. At this stage, the use of INCOTERMS such as FOB or FCA is prioritized, allowing ColExport

Valor S.A.S. to control the process up to the point of shipment and reduce financial risks (Maheshwari et al., 2021).

Subsequently, international transport is developed, primarily maritime, for high- value FOB industrial machinery and equipment, using specialized containers according to the nature of the cargo. For lower-volume, high-unit-value technological products, air freight is considered a strategic alternative, especially when the US client prioritizes delivery times.

**Table 3**

*Export Logistics Process and Responsible Parties*

Stage	Main Activity	Responsible Party
Export preparation	Export documentation and INCOTERM selection (FOB / FCA)	ColExport Valor S.A.S.
Export customs	Customs clearance in Colombia	Customs broker
Inland transport	Transportation to port	Logistics operator
International shipment	Maritime or air transport	Shipping line / Airline
Import customs	Customs clearance in the U.S.	Importer / Customs broker
Distribution in destination	Delivery to final customer	U.S. logistics operator
Final customer	Receipt of goods	U.S. buyer

*Note.* Own elaboration based on international logistics process design and INCOTERM application (Maheshwari et al., 2021).

The group must make a 5-year financial projection of the project, including balance sheet, profit and loss statement, cash flow and the internal rate of return.

**Year Financial Projection ColExport Valor S.A.S.**

***General Project Assumptions***

The financial projection is based on the assumption of progressive growth in exports

to the United States, driven by the selection of high-value FOB products and the use of data analysis for decision-making. An efficient cost structure is assumed, given that the company does not manufacture but rather acts as an intermediary specializing in export and commercial logistics (Pooja & Ailawalia, 2024)

An average annual revenue growth rate of 12% is considered, along with a controlled operating cost structure and a moderate initial investment in technology, data analysis, and working capital. The base currency used is the US dollar to facilitate international comparison.

**Table 4**

*Projected Income Statement (5 years)*

Year	Income	Operating Costs	Operational Profit	Net Profit
1	500.000	350.000	150.000	105.000
2	560.000	385.000	175.000	122.500
3	627.200	420.000	207.200	145.040
4	702.464	460.000	242.464	169.725
5	786.760	505.000	281.760	197.232

*Note.* Own elaboration based on projected revenue growth assumptions and financial planning model (Avagyan et al., 2022).

The projection shows increasing profitability, driven by a focus on high value-added products and markets with greater purchasing power, which increases net profit without depending on volume.

**Table 5**

*Projected Balance Sheet (Summary)*

Concept	Año 1	Año 3	Año 5
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Total Assets	300.000	420.000	600.000
Total Liabilities	120.000	150.000	180.000
Heritage	180.000	270.000	420.000

*Note.* Own elaboration based on projected asset, liability, and equity structure derived from financial assumptions.

The balance sheet reflects a healthy financial structure, with a low level of indebtedness and progressive strengthening of equity, resulting from reinvested profits.

## **Table 6**

### *Projected Cash Flow*

<b>Year</b>	<b>Net Cash Flow</b>
0	-200.000
1	90.000
2	110.000
3	135.000
4	160.000
5	190.000

*Note.* Own elaboration based on projected net cash flow and initial investment recovery analysis.

The cash flow shows a rapid recovery of the initial investment, supported by attractive margins and a flexible cost structure.

## **Internal Rate of Return (IRR)**

Based on projected cash flows, the project presents an approximate Internal Rate of Return (IRR) of 32%, higher than the average cost of capital for a Colombian MSME, indicating that the project is financially viable, profitable, and attractive to investors (Avagyan et al., 2022).

## **Financial Conclusion**

The five-year financial projection demonstrates that ColExport Valor S.A.S. is a solid and

sustainable project, with consistent growth, high profitability per exported unit, and a low level of financial risk. The use of data analysis for market and product selection allows for maximizing profits, strengthening the company's equity, and consolidating a competitive position in international trade, especially in the U.S. market.

## Conclusions

The analysis carried out using the provided database highlights the importance of Big Data tools in the study of international trade. The graphs generated in Google Colab facilitated data interpretation, allowing the identification of significant differences in FOB value, unit prices, and export distribution by destination continent and product type (Santos & Costa, 2020).

Furthermore, the use of Python and the support of ChatGPT for code generation proved to be efficient tools for processing and visualizing large volumes of data. This exercise demonstrates the relevance of data analysis in supporting strategic decision-making, market planning, and the identification of commercial opportunities, contributing to the development of technological competencies in both academic and business contexts (Parker, 2021).

The analysis conducted demonstrates that ColExport Valor S.A.S. represents a viable and competitive export-oriented MSME within the Colombian international trade sector. The structured international supply chain ensures efficiency, compliance, and risk reduction throughout the export process, while the financial projections indicate sustainable growth, strong profitability, and an attractive internal rate of return over the five-year horizon. Furthermore, the company's data-driven strategy allows it to focus on high value-added products and markets with greater purchasing power, such as the United States, positioning ColExport Valor S.A.S. as an innovative and strategically oriented exporter capable of maximizing value rather than volume in international trade (Jackson et al., 2024).

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