COMMERCIAL POSITION AND FISHMEAL EXPORT STRATEGY: TRENDS AND OPPORTUNITIES IN THE GLOBAL MARKET

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Abstract

The article examines the commercial position of fishmeal exports in the global market, emphasizing trends and opportunities. The identified problem centers on the sustainability of the fishing industry amid resource overexploitation, climate variability, and increasing international competition. Utilizing quantitative data from subheading HS Code 230120 of the Harmonized System (HS), sourced from the International Trade Center database, the study analyzes the performance of key exporters, including Peru and Chile, which face income fluctuations due to climatic phenomena such as El Niño and regulatory pressures. The methodology employed adopts a descriptive and quantitative approach, using tools like pivot tables to process and analyze data as in previous studies, and relate them to international trade (Montes Ninaquispe, Pantaleón Santa María, et al., 2024). The findings highlight significant growth in emerging markets such as India and Vietnam, while China consolidates its position as the largest importer, driven by its aquaculture industry. The study concludes that adopting sustainable practices, diversifying markets, and obtaining environmental certifications are essential to address the sector's challenges. Furthermore, the importance of innovative strategies is underscored to maintain competitiveness, contribute to economic development, and ensure the long-term sustainability of this key industry in international trade.

Keywords: Economics, Exports, International Trade, Comparative Advantage, Fishmeal, Global Market, Sustainability

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1. INTRODUCTION

The study is significant as it analyzes the commercial position of fishmeal exports, a crucial sector in the global industry. This analysis identifies emerging trends and opportunities that can influence exporters' commercial strategies, facilitating a better understanding of the market. Additionally, it provides valuable information on the sustainability and efficiency of international marketing, contributing to the economic development of producing regions, as in some past studies related to international trade (Montes Ninaquispe, Vasquez Huatay, et al., 2024).

Globally, fishmeal has become an essential product in the food industry, particularly in aquaculture and animal feed production (Auchterlonie, 2024). Its demand has been driven by the increasing consumption of aquatic products, leading to a rise in aquaculture production (Komlatsky, 2024). Furthermore, fishmeal is valued for its high protein content and essential amino acid profile, making it indispensable for the growth and health of fish and other animals (Muniasamy et al., 2024). One of the main challenges facing the fishmeal industry is the sustainability of fisheries (Gowda Thanh Quang et al., 2024). Overexploitation of marine resources has led to a decline in fish populations, threatening the availability of raw materials for production. Consequently, international regulations and conservation policies are becoming stricter, limiting allowed catches. This not only affects product supply but also increases production costs, as companies must invest in sustainable fishing practices and certifications that demonstrate their environmental responsibility (Torres Rojas et al., 2023).

Additionally, competition from substitute products, such as vegetable meals and other alternative protein ingredients, is increasing. The animal feed and aquaculture industries are exploring more sustainable and economical options, which could reduce the demand for fishmeal in the future (Pexas et al., 2023). Nevertheless, despite this competition, fishmeal maintains a competitive advantage due to its superior nutritional value and digestibility, which remain crucial factors in formulating high-quality balanced feeds. Therefore, opportunities in the global fishmeal market are linked to innovation and diversification. Companies that invest in research and development to improve production efficiency and product quality can capitalize on emerging trends.

Examining the situation by country, Peru and Chile are the world leaders in fishmeal production and export. Peru stands out for its highly developed fishing industry and its capacity to produce large volumes of high-quality fishmeal (Vergara, 2022), contributing to its economy alongside other prominent products (Montes Ninaquispe, Vasquez Huatay, et al., 2024). However, the Peruvian industry also faces considerable challenges. Climate variability, influenced by phenomena such as El Niño, significantly affects anchovy catches, the main species used in fishmeal production. This generates fluctuations in production and export revenues, affecting the sector's economic stability (Coayla et al., 2023).

In contrast, China, although a major importer of fishmeal, has been increasing its local production capacity. Investments in aquaculture and improved processing techniques have allowed China to partially reduce its dependence on imports (Hua & Chi, 2024). However, the quality of locally produced fishmeal still does not match that of South American countries, maintaining a significant demand for imported products. Additionally, trade policies and diplomatic relations also play a crucial role in the commercial flow of fishmeal between China and its international suppliers (He, 2015).

In Europe, countries such as Norway and Denmark have a strong aquaculture industry heavily reliant on imported fishmeal. European regulations on sustainability and traceability are among the strictest in the world, forcing exporters to meet high standards of quality and sustainability (Bujas et al., 2023). Although this represents a challenge for some producers, it can also be an opportunity to differentiate themselves in the market through certification and promotion of sustainable practices (Kumar & Tomar, 2024).

Given the above, the research question arises:

RQ: What is the commercial position of fishmeal exports in the global market?

Theoretically, the research is justified because it aligns with foreign trade theories, such as Ricardo's comparative advantage and the Heckscher-Ohlin theory, explaining how countries like Peru and Chile specialize in fishmeal production due to their abundance of natural resources and industrial capacity. Methodologically, this analysis provides a basis for studying other products, applying export evaluation methods that can be extrapolated to different sectors, allowing for a broader understanding of international trade. Practically, the detailed and descriptive information provides exporting and importing companies with valuable insights to improve their market strategies, identify growth and diversification opportunities, and manage risks related to market volatility and regulatory challenges, thereby enhancing their global competitiveness.

Thus, the main objective of the study is to describe the commercial position of fishmeal exports in the global market.

The article is structured as follows. Section 1 covers the importance of the study, highlighting its relevance. Section 2 addresses the background and theoretical foundations, providing the conceptual framework that supports the research. Section 3 describes the methodology used to analyze the topic, explaining the approaches. Section 4 presents the results, and Section 5 gives the discussion, where the findings are interpreted. Section 6 offers the conclusions and recommendations.

2. LITERATURE REVIEW

A study conducted by Luhur et al. (2021) focused on the factors driving fishmeal imports in Indonesia. The authors identified internal and external factors influencing this dynamic. Internal factors include low local production and the low protein content of domestic fishmeal, while external factors encompass export barriers and the continuity of fish supply. Suggested strategies include increasing local production, using fish catches as raw materials, and facilitating quality certification for local fishmeal.

An additional study by Loya-Olguín et al. (2024) evaluated the use of artisanal fishmeal as a partial replacement for soybean meal. Results indicated that including up to 7% fishmeal did not negatively affect dry matter intake or daily weight gain but improved feed efficiency and dietary energy utilization. Hussain et al. (2024) and Chiu et al. (2013) addressed the use of fishmeal in Chinese

aquaculture, highlighting that despite increased production of aquaculture feed, fishmeal use has remained stable due to improvements in feeding techniques and the use of alternative protein sources.

Morales et al. (2022) analyzed the evolution of export competitiveness in Chile's fishing and aquaculture industry, emphasizing the industry's importance to the national economy and its role in global trade. It was observed that Chile maintained comparative advantages in products such as salmon, trout, algae, and mussels, although with performance variations over time.

Oceana (2023) analyzed Peru's fishmeal exports in 2023, using customs data. Exports to China were exhausted in April 2023, impacted by the cancellation of the first anchovy fishing season. Unregulated companies saw an increase in fishmeal production and a decrease in landings for human consumption, with Ecuador being the main destination. High prices for squid meal reflected abundant landings. This scenario underscores the need for reinforced control due to the El Niño phenomenon.

The commercial position of a product or sector is defined as the strategic location of its exports and imports within the global landscape (Durán Lima & Alvarez, 2008). This position reflects how the product or sector is situated in relation to others in terms of international trade, considering factors such as trade volume, destination markets, global competition, and market share (Zavala Martinez, 2021).

To evaluate this commercial position, various aspects must be considered. The volume of exports and imports is a key indicator of commercial position (Phompida & Yu, 2023). Additionally, analyzing the total quantity of goods and services exported and imported allows for determining the magnitude of trade exchange and the dependence of a country or sector on international markets (Anghelache et al., 2019).

The destination markets of exports are essential to understand the diversification and penetration of the product or sector in different regions worldwide (Goda & Sánchez González, 2024). Furthermore, evaluating global competition involves analyzing the main competitors in the international market, identifying the leading countries and companies in the production and export of the product (Vázquez López, 2021). Market share refers to the percentage of the global market that a product or sector occupies compared to its competitors. A high market share indicates a strong commercial position, while a low share may signal the need for strategies to improve competitiveness.

3. RESEARCH METHODOLOGY

The study focused on evaluating the commercial position of fishmeal exports. A descriptive approach was adopted, allowing for the characterization of the behavior of these exports and providing a detailed overview of their evolution in international markets. In this context, the study was non-experimental in nature, as it was limited to the observation and analysis of existing data without intervention or manipulation of variables. The type of study was basic, with the fundamental purpose of expanding theoretical and practical knowledge on the subject. Additionally, a quantitative approach was chosen, enabling the collection and analysis of numerical data as in some past studies related to international trade.

The study population consisted of all recorded data of fishmeal exports worldwide under the HS Code 230120 of the Harmonized System (HS) (Flour, meal, and pellets of fish or crustaceans, mollusks, or other aquatic invertebrates), obtained from the Trade Map database[1] by International Trade Center, which provided detailed information on international trade of products. Consequently, the sample was equivalent to the population, ensuring exhaustive and representative coverage of fishmeal exports. The collected data were processed using pivot tables in Excel, allowing for efficient organization and analysis of the data, facilitating the identification of patterns and trends. Statistical indicators such as averages, means, and standard deviations were used to summarize and accurately describe the data.

The procedure included downloading data from the Trade Map website, organizing it into pivot tables, conducting descriptive analysis with statistical indicators, identifying trends, and creating tables to visualize the identified trends and patterns. Furthermore, to ensure the validity and reliability of the data used in the study, actions were taken such as source verification, quality control during data collection and processing, and consistency review to identify and correct possible discrepancies. However, it is important to recognize certain inherent limitations of the study, such as the dependence on secondary data and the lack of qualitative information that could have provided a deeper understanding of the underlying factors in fishmeal exports. Finally, ethical considerations in data handling were ensured throughout the study.

4. RESULTS

In Table 1, various trends are observed. Peru, the principal exporter, experienced a notable growth of 45.62% in 2017 but also faced its largest decline in 2023 with a -49.62%. India stood out with an impressive growth of 185.71% in 2016–2017 and 193.10% in 2021–2022, achieving the highest growth over the entire period from 2015–2023. Vietnam had significant growth of 53.89% in 2022 but recorded a decline of -10.43% in 2015–2016. Chile showed remarkable growth of 51.52% in 2019–2020, despite some consistent declines in other years. Denmark experienced more moderate fluctuations, with its highest growth of 26.22% in 2017 and the largest decline of -16.62% in 2016. Additionally, Peru had a standard deviation of 301.59, indicating high variability in its annual exports. India presented a standard deviation of 155.42, reflecting large year-to-year fluctuations. Vietnam had a standard deviation of 110.64, showing considerable variations, though less extreme than Peru and India. Chile showed a standard deviation of 58.96, suggesting moderate variability compared to the other countries. Denmark, with the lowest standard deviation of 27.26, indicated the least variability among the five principal exporters.

Regarding the percentage share of these countries in the most important years, the following data are observed. In 2017, Peru represented 34.29% of global exports, while in 2023 its share dropped to 16.34%. India had a significant increase in its share, from 1.75% in 2016 to 9.14% in 2023. Vietnam increased its share from 4.35% in 2016 to 8.72% in 2023. Chile maintained a relatively stable share, with 9.02% in 2016 and 8.37% in 2023. Denmark, for its part, represented 7.15% in 2017 and decreased to 5.49% in 2023.

[1] https://www.trademap.org/Index.aspx

Table 1. World exports of fishmeal and other aquatic invertebrates (thousands of USD)

Exporters	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*
Peru	1360	1176	1013	1475	1577	1503	1172	1797	1838	926
India	64	57	35	100	107	80	66	87	255	518
Vietnam	211	189	255	231	220	177	171	220	321	494
Chile	426	357	327	322	373	297	450	393	399	474
Denmark	317	343	286	361	334	322	318	340	274	311
Iceland	136	224	122	168	211	127	113	131	277	275
Russian Federation	72	84	80	74	88	86	110	145	213	262
Thailand	206	202	174	87	129	115	167	141	168	229
Morocco	173	150	169	153	145	171	186	181	261	225
United States of America	197	182	223	182	203	197	187	186	143	204
Others	1253	1260	1316	1150	1373	1300	1373	1385	1518	1746
Mundo	4417	4224	4000	4302	4760	4376	4312	5007	5667	5666

Source: Authors' analysis based on the Trade Map database of the International Trade Centre.

In Table 2, China stands out as the largest importer, with its share ranging from 32.96% in 2014 to 45.05% in 2023. China showed an average annual growth of 7.17% and a standard deviation of 427.17, reaching a maximum annual growth of 40% in 2020–2021 and a minimum decline of -0.71% in 2019–2020. Norway, with a share fluctuating between 5.46% in 2019 and 7.42% in 2023, had an average annual growth of 2.04% and a standard deviation of 70.11, recording its highest annual growth of 39.41% in 2020–2021 and a minimum decline of -7.42% in 2016–2017. Japan, with a share of 7.97% in 2014 and 4.62% in 2023, experienced an average annual decline of -2.59% and a standard deviation of 52.14, with a maximum annual growth of 19.91% in 2021–2022 and a minimum decline of -2.65% in 2014–2015. Turkey's share grew from 2.07% in 2014 to 4.03% in 2023, showing a remarkable average annual growth of 11.62% and a standard deviation of 62.50, with the highest annual growth of 53.20% in 2021–2022 and a minimum decline of -12.50% in 2019–2020. Vietnam's share fluctuated between 3.59% in 2014 and 3.41% in 2023, with an average annual growth of 2.88% and a standard deviation of 25.27, reaching a maximum annual growth of 28.02% in 2016–2017 and a minimum decline of -1.72% in 2017–2018.

Table 2. World imports of fishmeal and other aquatic invertebrates (thousands of USD)

Importers	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*
China	1562	1798	1617	2224	2228	1975	1961	2745	2990	2914
Norway	398	296	310	287	292	266	236	329	438	480
Japan	378	368	225	249	288	306	290	221	265	299
Turkey	98	120	151	157	180	216	189	203	311	261
Vietnam	170	174	182	233	229	194	238	164	190	221
United Kingdom	127	107	132	123	157	178	189	190	197	191
Taiwan	215	203	168	183	207	176	181	194	204	158
Germany	325	215	217	110	143	147	146	128	152	156
United States of America	93	97	109	119	113	95	102	127	165	153
Greece	101	86	97	85	114	124	140	135	156	152
United States of America	93	97	109	119	113	95	102	127	165	153
Greece	101	86	97	85	114	124	140	135	156	152
Others	1080	991	949	873	955	981	999	988	1082	1178
World	4740	4638	4364	4845	5132	4878	4915	5685	6471	6470

Source: Authors' analysis based on the Trade Map database of the International Trade Centre.

In Table 3, the highest annual growth rate was observed for the World in 2015 with a 7.38% increase, while China experienced a remarkable 16.00% growth in the same year. Norway saw its peak growth in 2018 with a 17.57% increase, Japan in 2022 with a 10.27% rise, and Turkey showed a significant 13.04% growth in 2022. In terms of total growth over the period from 2014 to 2023, Norway led with a 19.89% increase, rising from USD 1.76 per kilogram in 2014 to 2.11 in 2023. It was followed by Turkey, with a 24.81% growth, increasing from 1.33 to USD 1.66. China had a total growth of 18.00%, rising from 1.50 to USD 1.77. The World recorded an increase of 14.09%, from 1.49 to USD 1.70, while Japan experienced a growth of 10.07%, from 1.49 to USD 1.64. Regarding the smallest annual decline, the World had its lowest decrease in 2019 with -4.76%, China also in 2019 with -8.55%, Norway in 2015 with -7.39%, Japan in 2019 with -5.44%, and Turkey in 2019 with -9.63%. Over the entire period, China had the smallest total decline with -0.90%, showing relative price stability. The average annual growth rate was 1.53% for the World, 1.80% for China, 1.99% for Norway, 1.00% for Japan, and 2.48% for Turkey, reflecting an upward trend in prices. The standard deviation of prices, indicating their variability, was 0.097 for World, 0.140 for China, 0.187 for Norway, 0.096 for Japan, and 0.143 for Turkey, showing that Norway had the highest price variability while Japan and World exhibited the lowest variability.

Table 3. Purchase price of fish meal and other aquatic invertebrates (USD per kilogram)

Importers	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*
World	1.49	1.60	1.50	1.38	1.47	1.40	1.41	1.48	1.63	1.70
China	1.50	1.74	1.55	1.41	1.52	1.39	1.37	1.50	1.64	1.77
Norway	1.76	1.63	1.76	1.48	1.74	1.86	1.73	1.90	1.99	2.11
Japan	1.49	1.60	1.43	1.38	1.47	1.39	1.39	1.46	1.61	1.64
Turkey	1.33	1.51	1.40	1.27	1.35	1.22	1.23	1.38	1.56	1.66
Vietnam	1.61	1.54	1.52	1.45	1.57	1.50	1.50	1.54	1.66	1.41
United Kingdom	1.79	1.70	1.70	1.48	1.65	1.66	1.68	1.89	1.91	2.09
Taiwan	1.30	1.42	1.33	1.27	1.37	1.31	1.29	1.36	1.47	1.50
Germany	1.54	1.50	1.46	1.35	1.43	1.57	1.51	1.63	1.74	1.93
United States of America	1.61	1.94	2.00	1.90	1.89	1.83	1.68	1.69	1.93	2.07
Greece	1.41	1.37	1.36	1.21	1.35	1.30	1.34	1.38	1.51	1.73
World	1.49	1.60	1.50	1.38	1.47	1.40	1.41	1.48	1.63	1.70

Source: Authors' analysis based on the Trade Map database of the International Trade Centre.

5. DISCUSSION

Firstly, it is observed that Peru and Chile continue to lead in the production and export of fishmeal. Peru has maintained a prominent position due to its highly developed fishing industry and its capacity to produce large volumes of high-quality fishmeal (Vergara, 2022). However, this leadership is not without challenges. Climatic variability, especially influenced by phenomena such as El Niño, affects anchovy catches, the main species used in fishmeal production. This leads to fluctuations in production and export revenues, which in turn affect the economic stability of the sector (Coayla et al., 2023). On the other hand, India has shown remarkable growth in its fishmeal exports. This increase positions India as an emerging competitor in the global market. India's notable growth can be attributed to investments in aquaculture and the improvement of processing techniques, which have enabled the country to increase its production capacity (Hua & Chi, 2024). Vietnam, although showing significant growth in 2022, has also recorded declines in previous years, indicating a fluctuating trend. Chile, despite maintaining relative stability in its market share, also faces similar challenges to Peru in terms of climatic variability and fishery sustainability (Gowda Thanh Quang et al., 2024). In contrast, Denmark shows more moderate fluctuations in its exports, indicating less variability compared to other major exporters. This stability can be attributed to strict sustainability and traceability policies in the European Union, which require exporters to comply with high standards of quality and sustainability (Bujas et al., 2023). At the importer level, China stands out as the largest consumer of fishmeal. This sustained growth is due to the increase in aquaculture production and the high demand for aquatic products (Komlatsky, 2024). However, the quality of locally produced fishmeal in China still does not match that of South American countries, which maintains a considerable demand for imported products. Additionally, trade policies and diplomatic relations play a crucial role in the fishmeal trade flow between China and its international suppliers (He, 2015). In the European context, countries like Norway and Denmark have a strong aquaculture industry that heavily depends on imported fishmeal. European regulations on sustainability and traceability are among the strictest in the world, requiring exporters to meet high standards of quality and sustainability (Bujas et al., 2023). This represents a challenge for some producers but can also be an opportunity to differentiate themselves in the market through certification and the promotion of sustainable practices (Kumar & Tomar, 2024).

6. CONCLUSION

Peru, the largest exporter of fishmeal, experienced notable growth in 2017, followed by a significant decline in 2023, reflecting high instability attributed to variability in fish catches, changes in global demand, and internal production issues. India has shown exceptional growth, establishing itself as one of the fastest-growing exporters during the period, with sustained increases suggesting an expansion of its productive capacity and greater penetration into international markets, although with annual fluctuations in 2016–2017 and 2021–2022. Vietnam registered significant growth in 2022, although it faced setbacks in 2015–2016, indicating fluctuating demand and potential challenges in its productive capacity. However, the overall trend has been positive, increasing its market share globally from 2016 to 2023. Chile has shown relative stability, with a notable increase in 2019–2020 and declines in other years, suggesting a constant productive capacity and sustained demand. Denmark has shown moderate fluctuations, with growth in 2017 and a decline in 2016, reflecting less variability in its productive capacity and constant demand, although its global market share has slightly decreased from 2017 to 2023. China stands out as the largest importer of fishmeal, with a sustained increase in its global market share from 2014 to 2023, reflecting robust and growing demand, likely driven by its aquaculture industry. Norway has shown steady growth in its imports, with notable increases in 2020–2021, driven by its aquaculture industry. Japan has seen a decline in its imports from 2014 to 2023, despite peaks of growth in 2021–2022, possibly due to changes in its industrial needs or increased competition from other countries. Turkey has registered notable growth from 2014 to 2023, reflecting an expansion in its aquaculture industry. Vietnam has maintained a stable share in the import market, with consistent demand from 2014 to 2023. The analysis of fishmeal prices reveals an upward trend, with global price increases during the period from 2014 to 2023. China, Norway, and Turkey have shown the largest increases in purchase prices, reflecting growing and sustained demand. Price variability has been more pronounced in Norway, while Japan and the global market have shown less variability, suggesting greater stability.

To strengthen the commercial position of fishmeal exports, it is crucial to adopt sustainable fishing practices, invest in research and development to improve product quality and efficiency, and diversify markets to reduce dependence on a single destination like China. Environmental certifications can enhance product perception and open new

markets, while exploring niches such as specialized meals can increase competitiveness. Implementing advanced management and traceability technologies, along with optimizing supply chain and logistics, will reduce costs and improve efficiency. Additionally, fostering strategic alliances, training staff in sustainable practices, and staying updated with global market trends are key strategies to ensure stability and sustainable growth in the global market.

This article is of significant importance for future research, as it provides a comprehensive descriptive analysis of the commercial position of fishmeal in the global market, laying a foundation for exploring deeper relationships and influences at advanced research levels. The methodological approach not only facilitates the identification of trends and patterns but also enables the replication of this procedure to analyze other products or key sectors in international trade, thereby broadening the scope of trade research. However, there are inherent limitations in the study, such as its reliance on quantitative data, which restricts the inclusion of qualitative perspectives that could enrich the understanding of underlying factors. Furthermore, the study's scope is constrained by the period analyzed and the availability of updated data from the source used, whose content and validity depend on periodic updates.

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