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Market Diversification and the Concentration of Peruvian Baby Lima Bean Exports Globally

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Abstract- In the context of international trade, exports of baby lima beans represent a fundamental pillar of the Peruvian economy, with a significant increase in exports in recent years. The growth in exports can be attributed to the quality of the product, its nutritional value and the growing global demand for organic food, particularly in key markets in North America, Asia and Europe. In this context, the article presents an analysis of the diversification and concentration of Peruvian baby lima bean exports worldwide over the past ten years (2014 - 2023), paying particular attention to the concentration of the markets and companies involved. The study employs a quantitative methodology, analysing statistical data related to baby lima bean exports from SUNAT obtained through the VERITRADE trade intelligence tool. The Herfindahl-Hirschman Index (HHI) was used to assess the concentration between destination markets and exporting firms. The results show that the analysis of baby lima beans exports in Peru between 2014 and 2023 reveals fluctuations in both FOB value and net weight, reaching a maximum concentration of exporting firms in 2017 and a trend towards diversification in recent years. However, the number of destination markets remained stable with a slight upward trend. Finally, the HHI of exporting companies showed a clear trend towards diversification, from 3,198 in 2014 to 928 in 2023. Therefore, it is recommended to boost the industry through export strategies that increase added value and diversify markets, strengthening the production chain with sustainable practices.

Keywords-Market diversification, Competitiveness, Herfindahl-Hirschman, Export, Baby Lima Bean.

I. INTRODUCTION

This study examines the concentration of Peruvian exports of baby lima bean, a relevant product for the national economy. Despite its value and growth in the international market, the sector is characterised by concentration in a few markets and companies, which generates vulnerability to external fluctuations and limits its sustainable development [1], [2].

This study described Peruvian baby hen pallar exports at the global level during the period 2014-2023, focusing on the analysis and evaluation of the competitiveness of Peruvian markets and exporting companies. This product has been demonstrated to constitute a pivotal economic foundation for Peru, with evidence indicating a notable surge in exports. However, in light of the intensifying globalisation process, it is imperative to pursue a diversification of markets to guarantee the sustainability of the baby lima bean sector and its contribution to the Peruvian economy [3], [4]. These findings reinforce the growing significance of the baby lima bean on the global market, establishing it as a pivotal contributor to the Peruvian economy.

Peru has emerged as a prominent and influential supplier of baby lima bean, exhibiting a notable expansion in its presence within international markets, particularly in North America [5], [6], [7], [8]. The regions of Lambayeque and Ica are the most prominent producers of this nutritionally dense legume in the country, largely due to their favourable climatic conditions and the implementation of effective agricultural practices [9], [10].

The baby lima bean is a legume native to the Americas, and is widely regarded as one of the most important ingredients in contemporary Peruvian cuisine due to its high nutritional value. The earliest archaeological evidence of this legume is found in the depths of the Guitarrero cave, in the Callejón de Huaylas, Sierra de Áncash, with dates ranging from 8,200 to 7,800 years BC. Furthermore, archaeological evidence indicates that pallares were consumed in the coastal region of La Libertad as early as 5,000 BCE [11], [12], [13].

Over the past few decades, Peruvian agriculture has undergone a significant period of growth and diversification, accompanied by notable advances in production and export techniques. The agricultural sector in Peru has undergone significant growth, accompanied by diversification of crops and enhancements in production and export techniques. A case in point is the production of baby lima bean, which has undergone a notable transformation. In 2018, the export value of baby lima bean was recorded at 6,411 thousand dollars. This value increased to 7,824 thousand dollars in 2019, reaching 7,949 thousand dollars in 2020. In 2021, exports reached a value of 13,125 thousand dollars, and in 2022, they increased to 16,192 thousand dollars. In 2023, exports exhibited a noteworthy increase, reaching an FOB value of 19,757 thousand dollars. This noteworthy expansion in export volume serves to illustrate the country's capacity to meet international demand with high-quality products [14]. The principal export destinations for Peruvian baby lima bean are Ecuador, Panama, Canada, Cuba and China. These countries represent prospective markets due to their growing demand for healthy and natural products, thus ensuring a promising future for Peruvian baby lima bean exporters. This trend not only reflects the resilience and adaptability of the Peruvian agricultural sector, but also its capacity to compete in demanding international markets [15], [16].

This increase can be attributed to several key factors, including the recognised quality of Peruvian products, their high nutritional value, and the growing global demand for organic agricultural food [17], [18], [19]. In strategic international markets such as the United States, Japan and Spain, where there is a strong preference for natural and organic products, baby lima bean has successfully positioned itself due to the implementation of efficient agricultural practices [20].

Another significant factor is the cultural value attributed to the baby lima bean since time immemorial, including ancestral customs that are on the verge of disappearing in its place of origin. Nevertheless, the cultural value of the baby lima bean has been a pivotal element in its evolution [21]. Nevertheless, the advent of international tourists has prompted a renewed interest in the traditions and history associated with this legume. This facilitates enhanced recognition of the product, which in turn stimulates the expansion of exports [22].

Furthermore, the certifications provided by the government confer benefits upon national producers, affording them the opportunity to promote baby lima bean both nationally and internationally. The aforementioned certifications permit the product to be present in a multitude of global markets, whilst simultaneously encouraging the implementation of optimal production practices [23]. The export of baby lima beans from Peru is experiencing a period of significant growth, driven by the rising demand for this highly nutritious pulse in international markets. This trend is driven by the market opportunity offered by the country, which is complemented by a seasonal commercial window that is influenced by the main producers of baby lima bean. This scenario offers considerable economic potential for Peruvian farmers and exporters, thereby contributing to national economic development. Furthermore, government assistance in the form of export work plans and protocols provides a pathway to international markets, thereby reinforcing the economic viability of this activity [24].

The baby lima bean business has successfully expanded its international presence by exploring and entering new markets in various parts of the world. Such diversification serves to mitigate the risks associated with dependence on a single market, thereby contributing to more stable and sustainable long-term growth [25]. The success of Peru's baby lima bean export industry has been evidenced over time due to its continuous growth and effective market expansion strategy. This has led to a notable enhancement of the country's international visibility in this particular sector [26].

The objective of this empirical study is to provide a comprehensive understanding of Peru's baby lima bean exports on a global scale. The content is organised into clearly defined sections, which facilitate analysis and understanding of the subject matter. First, the results of the descriptive analysis are presented, detailing the data and trends observed in the international trade of Peruvian baby lima bean.

These descriptive results may include details on total export volumes, the main destinations, seasonal variations in production and exports, as well as other significant trends derived from the data collected in the research. This section establishes a solid basis for understanding the scope and nature of baby pear exports, before proceeding to a more detailed analysis [27].

In this context, the article presents an analysis of the diversification and concentration of Peruvian baby lima bean exports worldwide over the past ten years (2014 - 2023), paying particular attention to the concentration of the markets and companies involved. It provides stakeholders with information about baby lima bean exports, presents relevant data, and identifies opportunities for participation in this growing sector. Furthermore, the Herfindahl-Hirschman Index (HHI) was employed to assess the concentration of both importing markets and exporting companies of baby lima bean, with the objective of promoting diversification and sustainable development within the sector [28].

II. THEORETICAL FRAMEWORK

In the context of international trade, the export sector plays a pivotal role in the economic growth and stability of numerous countries. This concept is founded upon classical theories of international trade, which have undergone significant evolution over time. In Smith's view, if a country has a comparative advantage in the production of a particular good with fewer resources than another country, it should specialise in the production of that good and engage in trade with other countries to obtain the goods it cannot produce efficiently [29].

The global market for the baby lima bean (Phaseolus lunatus) is demonstrating considerable growth, driven by rising demand and its perceived nutritional value. Baby lima bean is a nutritionally dense food, containing high levels of protein, fibre and antioxidants. This recognition provides further incentive for increased production and diversification into international markets [30].

Countries such as Peru and Argentina are particularly well-suited to the production of baby lima bean, due to the favourable climatic conditions and efficient agricultural practices that they possess. These countries have increased their production capacity in order to meet global demand and have introduced innovative technologies with the objective of increasing yield and quality.

Peru is one of the leading producers and exporters of baby lima bean. The combination of ideal climatic conditions and traditional cultivation methods with modern innovations allows Peru to produce high-quality products that are in great demand on the international market. Furthermore, the diversification of by-products increases the added value and attractiveness of the product in international trade [31].

Furthermore, Argentina plays an important role in the global production of baby lima bean, utilising advanced cultivation and processing techniques to optimise both yield and quality. The implementation of innovative cultivation and processing techniques has enabled the Argentinean nation to maintain a competitive advantage in the global market [32].

The baby lima bean trade not only contributes to economic growth through exports, but also creates employment opportunities and enhances food security in producing countries. The export of baby lima bean has a beneficial effect on the rural economy, increasing farmers' incomes and contributing to sustainable development [33].

International trade serves to illustrate the comparative advantage that exists between countries in the products they are best at producing, such as baby peas and vegetable crops. A country that possesses the requisite climate, land and efficient farmers will undoubtedly demonstrate superior performance in the cultivation of vegetable crops such as baby peas. This may prompt Peru, a significant exporter of vegetable stews, to focus its exports on potential markets where there is a greater demand for this product, particularly given the country's expertise in this area [34], [35], [36].

The export of vegetable crops, such as baby lima bean, which is concentrated in a few potential markets, gains purchasing power through the demand for these crops. However, over time, the product in question tends to lose popularity. Consequently, exporters seek to diversify their export destinations in order to identify novel business opportunities. Nevertheless, the expansion of operations into new geographical areas presents a number of challenges, including the need to adapt to novel market conditions, overcome trade barriers and manage information effectively [37].

In order to achieve the objectives of the research, the study was based on the Herfindahl-Hirschman theory, which indicates the levels of competitiveness of industries focused on a specific sector. The variables are classified as either monopolistic or oligopolistic in accordance with the degree of market concentration observed. An index of competitive concentration below 1500 is indicative of a high level of market competitiveness. Conversely, an index value between 1500 and 2500 indicates a moderate level of market concentration, suggesting a balanced competitive landscape. Nevertheless, an index exceeding 2500 indicates a high level of concentration, which typically reduces competitiveness. Consequently, a moderate concentration signifies equilibrium within the competitive landscape of the industries under examination. Nevertheless, an index value exceeding 2500 indicates that, due to the high concentration of industries, competitiveness is significantly diminished. It can be reasonably deduced that the encouragement of the participation of start-ups and small firms can revitalise competition in the market, thereby boosting investment and innovation in a number of sectors. By establishing an environment conducive to competition, policymakers can foster a dynamic economic ecosystem that supports sustainable growth and long-term prosperity [38].

The diversification of markets is regarded as a pivotal strategy within the context of business development at the national or international level. Projects pertaining to this strategy are primarily focused on facilitating the international expansion of companies. However, the extent of diversification is contingent upon the number of markets in which the companies operate. Conversely, the implementation of a market diversification strategy yields advantages for both companies and the economy by optimising the country's foreign trade. Consequently, in order to meet the specific needs of each market, it is essential to innovate and strengthen research and development, generate employment opportunities and foster greater collaboration within the productive sector [39], [40], [41].

The progressive advancement of the economy gives rise to an enhanced role for state policy in the monitoring and pursuit of instruments to enhance the efficacy of agricultural systems at all levels of management. The study presents the potential for capturing the impact of innovation and investment in the export-focused agricultural sector of the economy. This is achieved through the utilisation of tools designed to assess the state and functioning of regional and sectoral agricultural systems. The aforementioned results can be successfully applied to forecast development scenarios and inform the management decisions of regional experts [42].

In order to enhance the global competitiveness of agricultural exports and promote resilient agricultural development, it is of the utmost importance to reduce the logistical costs associated with agricultural exports, accelerate the adoption of technological innovations in the agricultural sector and establish agricultural support initiatives [43].

In order to maintain its diversity in the global market, the Andean region must adopt a proactive strategy. This necessitates the formation of strategic alliances at the local, regional and international levels. At the local level, these alliances facilitate the optimisation of production, the value chain and the connection between producers and consumers. At the regional level, they facilitate the exchange of knowledge, technologies and business strategies, thereby strengthening the region and promoting sustainable development. At the international level, cooperation can yield mutual benefits, provided that transparent and equitable agreements are established to safeguard genetic and cultural resources [44].

One study examined the potential for diversification of a country's exports to stimulate economic growth, with a particular emphasis on the quality of the products in question. It is not merely a matter of selling a greater quantity of goods to a greater number of markets; rather, it is about offering products of the highest quality. Following the analysis of data from 133 countries over a period of nearly two decades, it was revealed that those with diversified, high-quality exports experienced a greater economic boost. Consequently, for countries seeking to sell local products such as baby pallar and vegetable stews, it is not only a matter of finding new consumers, but also of ensuring that these products meet the requisite quality standards [45].

Other studies have investigated the potential of export diversification to contribute to poverty reduction in Peru. A comprehensive analysis of data from 48 countries over an extended period revealed a clear correlation between the diversification of export products and a reduction in poverty

levels. This is encouraging for growers of baby peas and vegetable crops, as the marketing of these products in a variety of markets could foster job creation, increase incomes and improve people's access to needed goods and services [46].

A further study was conducted to investigate the impact of export diversification on the performance of firms in developing countries. The analysis, which focused on Peruvian farmers, revealed that firms that sold their products in multiple markets exhibited higher productivity, profitability, and growth rates. This indicates that for vegetable exporters, expansion into new markets may prove an effective strategy for business success [47].

Another study examined the impact of export diversification on exchange rate stability in developing countries. The researchers analysed data from 135 countries and found that those with greater export diversity experienced more stable exchange rates. This is of particular importance for exporters of minerals, as a stable exchange rate serves to reduce the inherent risks and uncertainties associated with international transactions [48].

Furthermore, the analysis demonstrated the impact of export diversification on productivity growth in Peruvian firms. The findings indicated that firms with a greater variety of products tend to exhibit higher levels of productivity. This suggests that vegetable exporters may experience an increase in productivity if they expand their product range and explore new markets [49].

Nevertheless, the impact of export diversification on economic growth is contingent upon the utilisation of an advanced model. The findings indicated that the positive impact is more pronounced in countries with robust financial systems. In other words, the beneficial effects of diversification in the export of beans on the economy are contingent upon the existence of a robust financial system that provides support to Peruvian producers and exporters [41].

Export diversification also exerts an influence on the survival of firms in developing countries. The analysis of agricultural firms in Peru revealed that those that traded their products in several markets were more likely to remain in business. This indicates that for vegetable exporters, diversifying their markets may represent a pivotal strategy for success in a competitive business environment [50].

To provide context, an analysis was conducted to examine the impact of export diversification on the range and volume of products exported by a country. The findings indicated that countries with greater export diversity tend to offer a more diverse range of products. For vegetable exporters, this suggests that exploring new markets could facilitate access to a wider range of products and open up new trade opportunities. [51]

Furthermore, it was established that firms that distributed their products across a greater number of markets demonstrated elevated productivity, thereby illustrating their capacity to produce a greater quantity with the same resources. This suggests that, for vegetable exporters, diversifying their markets may be an effective strategy to enhance efficiency and competitiveness [40].

The findings of the research study indicated that diversification contributes to economic growth, and that this growth in turn encourages further diversification. This finding is encouraging for countries seeking to enhance their economic performance by exporting products such as baby lima bean, as it suggests that diversifying exports can stimulate a virtuous cycle of growth and expansion [52].

The objective of the study was to analyse the impact of export diversification on agricultural enterprises in Peru. The study demonstrated that firms that market their products in diverse markets not only enhance their productivity but are also more likely to survive, particularly if they enter more demanding markets. Moreover, diversification was identified as a strategy that enables firms to better manage economic shocks, such as financial downturns. For Peruvian vegetable exporters, this suggests that diversifying their markets may be a crucial strategy for ensuring long-term success and stability [53].

The export of Peruvian baby lima bean can be concentrated or diversified, contingent on the number of importing countries. In other words, if Peru exports to a limited number of destination markets, this indicates a reliance on these countries due to a high concentration of exports from the agricultural sector in a single product, such as baby lima bean. Conversely, export diversification confers advantages, including the expansion of the number of destination countries for baby lima bean. Moreover, the country may attain economic stability due to the absence of reliance on a single or limited number of markets, with potential risks distributed across a range of destination countries. Furthermore, the export diversification strategy offers the additional advantage of enhancing the added value of the production process of Peruvian baby lima bean in response to the demands of the international market [54].

Consequently, when companies concentrate their exports on a limited number of destination countries, they may be adversely affected by a decline in demand, which may prompt them to reduce the price of baby lima bean. In the event of an economic crisis in the destination market, this could result in a significant reduction in the consumption of baby chicken, which may in turn lead to a decrease in exports in terms of both volume and value of the product [55].

Consequently, in order for the market diversification strategy to be successful, comprehensive research must be conducted on the characteristics of potential consumers, cultural norms, preferences, and legal frameworks of the target country with respect to the importation of vegetables such as baby lima bean [56].

In conclusion, an exhaustive examination of 85 studies on the correlation between export diversification and economic growth in developing countries revealed that the findings indicated that an increase in export diversity is associated with enhanced economic growth. Nevertheless, the strength of this relationship may be contingent upon the country's level of development, the quality of its institutions, and the products it

exports. With regard to Peru, this indicates that the diversification of vegetable exports could prove an efficacious strategy, contingent on the country's specific context being duly considered [57].

III. METHODOLOGY

This study employs a quantitative methodology, with the objective of analysing statistical data related to exports of baby lima bean. This approach enables the examination of the relationship between the quantitative components, thus facilitating the interpretation of the resulting data [58]. The research is fundamental in nature, with the objective of providing information on the exports of baby lima bean. The research design is non-experimental, whereby the data is presented in a natural context, without any manipulation of the variables under analysis in the Peruvian export studies [59]. The population of baby lima bean under investigation comprised the 3,600 data points extracted from SUNAT customs declarations of goods (DAM) pertaining to the national subheading 07.13.39.91.00. These data were obtained from the VERITRADE trade intelligence tool and submitted by countries and agro-exporting companies of baby lima bean over a 10-year period, from 2014 to 2023 [60]. Furthermore, the Herfindahl-Hirschman Index (HHI) was employed to quantify market concentration, a tool with widespread application in national economic contexts. Consequently, the analysis enabled the identification and assessment of the level of concentration in baby lima bean exports. In accordance with the authors [61], [62], [63], [64], [65], [66], [67], [68] this tool enables the calculation of the percentage share of each entity by squaring and summing the values. A systematic examination of the concentration of destination markets and exporting firms of baby peas is conducted. The index formula is as follows:

$$IHH = \sum_{1}^{n} (Si)^2$$

The HHI indicator between 1,500 and 2,500 points is considered moderately concentrated, however, if the indicator exceeds 2,500 points, it is considered a high market concentration [69], [70].

IV. RESULTS

In order to conduct a comprehensive analysis and assessment of the evolution of Peruvian baby lima bean pea exports, data were obtained from the Veritrade trade intelligence tool. The principal indicators presented in Tables I and II comprise the FOB value recorded, the net weight reflecting the quantity of baby lima bean exported, the number of exporting companies and the diversity of destination markets for this legume. These data will facilitate a comprehensive analysis of trends and patterns in Peruvian baby lima bean exports over the period 2014-2023.

TABLE I
INDICATORS OF BABY LIMA BEAN EXPORTS

Indicators	2014	2015	2016	2017	2018
FOB value Thousands of USD	11,827	7,769	6,467	6,119	6,411
Net Weight Thousands of KG.	6,551	4,008	3,959	3,240	4,290
Number of companies	37	23	32	25	30
Number of Markets	53	44	45	46	50

Note. Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

The value of Peruvian exports of baby lima bean experienced a notable decline in 2015. However, following several years of recession, an increase of 4.77% was recorded in 2018 in comparison to the previous year, indicating a recovery in international demand. With regard to the quantities exported, a downward trajectory is evident until 2017, after which a striking increase of 32.40% is observed in the subsequent year. With regard to the diversification of exporting companies, a notable decline is evident, from 37 in 2014 to 23 in 2015. This suggests a consolidation in the market. However, in 2018, a balance was recorded by collecting data from 30 exporting companies of baby lima bean, indicating a recovery in the market share of companies in the market. In conclusion, the diversity of importing markets exhibited a decline, with the number of markets decreasing from 53 in 2014 to 44 in 2015. However, in 2018, the number of participating markets reached 50, indicating a recovery in market diversification.

TABLE II
INDICATORS OF BABY LIMA BEAN EXPORTS

Indicators	2019	2020	2021	2022	2023
FOB value Thousands of USD	7,824	7,949	13,125	16,192	19,757
Net Weight Thousands of KG.	6,213	5,459	8,601	9,975	11,068
Number of companies	38	35	32	32	33
Number of Markets	41	45	52	51	51

Note. Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

Following the crisis precipitated by the global pandemic of the novel coronavirus, exports of Peruvian baby lima bean have exhibited a sustained period of growth. In 2023, a 22.02% increase in FOB value was recorded in comparison to the previous year, reflecting an increase in international demand and a recovery in the global economy. With regard to the quantities exported, an upward trajectory has been discernible since 2021, with a particularly pronounced increase of 10.96% in 2023. This growth indicates enhanced competitiveness in the international market and augmented production and logistics capacity. With regard to the diversification of exporting companies, an initial reduction was observed, from 38 companies in 2019 to 45 in 2020. This may be attributed to the

challenges generated by the pandemic. However, since 2023, a balance has been achieved with 33 exporting companies exporting baby chicken, indicating consolidation in the market. Finally, with regard to the diversity of importing markets, there was an increase from 41 markets in 2019 to 45 in 2020. Subsequently, since 2022 it has expanded to 51 participating markets, indicating a wider geographical dispersion of exports and a greater presence in international markets. Despite the challenges generated by the Coronavirus Disease 2019 (Covid-19) pandemic, exports of Peruvian baby lima bean have experienced significant growth in recent years. The recovery in international demand, competitiveness and diversification of companies and markets suggest a promising future for the industry.

TABLE III
BABY LIMA BEAN DESTINATION MARKETS IN THOUSANDS USD FOB

Country Destination	2014	2015	2016	2017	2018
United States	2,753	1,979	887	562	1,004
Japan	145	438	197	108	464
Spain	1,036	1,609	1,002	758	1,306
Canada	373	699	582	654	727
Turkey	1,310		240	131	70
Jamaica	276	426	394	279	197
Lebanon	1,614	1,116	1,164	981	798
Panama	223	320	324	268	202
Uruguay	450	264	274	285	275
South Korea					
The Netherlands	232	5	30	12	55
Poland	93				
Chile	52	44	57	102	74
Israel	345	109	93	94	395
United Kingdom	46				
Other	2,880	759	1,223	1,884	844

Note. Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

Table III demonstrates that the United States initially held the position of the primary importer of baby pallar, yet has since exhibited a persistent decline in this role. However, 2018 saw a significant increase of 78.52% in comparison to the previous year. A comparable pattern is evident in Japan, where an initial decline was observed from 2016 onwards, followed by an impressive growth of 328.36% in 2018. Conversely, Spain assumed the role of a principal importer of baby lima bean in 2018, exhibiting a growth of 72.38% in comparison to the preceding year. This considerable expansion positions it as a principal competitor in the market. In Canada, a gradual increase has been observed since 2017, with a growth rate of 11.08% in the subsequent year. This upward trajectory indicates an increasing demand for baby lima bean within the country. Conversely, Turkey suspended its imports of baby lima bean in 2015 and, although it resumed imports in 2016, it has since experienced a continuous decline. This pattern indicates a decline in demand or a reorientation of the country's trade policy.

TABLE IV
BABY LIMA BEAN DESTINATION MARKETS IN THOUSANDS USD FOB

Country Destination	2019	2020	2021	2022	2023
United States	766	1,470	7,548	8,536	9,826
Japan	113		388	2,014	2,020
Spain	981	1,978	542	1,524	1,857
Canada	350	579	842	458	1,047
Turkey	1,024	374	500	376	910
Jamaica	169	277	388	453	624
Lebanon	918	610	261	436	619
Panama	233	251	289	256	364
Uruguay	294	273	388	197	264
South Korea					256
The Netherlands	58	165	167	186	232
Poland	255	114	149	313	230
Chile	87	198	170	15	166
Israel	135	287	95	362	150
United Kingdom	145	142	149	44	142
Other	2,296	1,231	1,249	1,022	1,050

Note. Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

Table IV identifies the United States as the primary importer of baby pallar. Following the impact of the global pandemic in 2020, a notable expansion was observed, with a 15.11% increase in 2023 compared to the previous year. Conversely, Japan ceased importing baby pallar during the pandemic, resuming imports in limited quantities in 2021 and increasing significantly in 2022 following the recovery of public health conditions. Similarly, Spain had relatively high imports in 2020, but these declined in subsequent years. With regard to Canada, there was a slight increase in imports in 2023 in comparison to previous years. Turkey, which had recorded slightly higher imports in 2019, saw a significant decrease in the following years due to the pandemic. It can thus be concluded that the pandemic had a considerable impact on the growth or decline of imports of Peruvian baby pallar in the aforementioned countries.

TABLE V
BEBY LIMA BEAN EXPORTING COMPANIES IN THOUSANDS OF USD FOB

Exportadora	2014	2015	2016	2017	2018
Brolem Company	812	869	653	265	523
Interloom	365	93	145	32	503
Andes Food & Beverage	615	703	559	383	738
Agro Fergi	695	890	816	734	798
Afi Impex Peru					
Del Valle Consortium	968	320	164		
Blue Pacific Oils					66
Xpodeka		284	133	141	70
Geale Agrotrading					139
Blue Market				97	344
Agro Cosecha Paz					

Food Export North	465	451	297	114	154
Aplex Trading	1,647	750	617	455	438
MN Peru Foods					
Raw Food Agrobusiness					
Other	6,262	3,409	3,083	3,897	2,639

Note. Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

Table V illustrates the considerable fluctuations in exports of baby lima bean by major companies in the sector. It is worthy of note that Brolem Company experienced a marked increase in growth in 2018, with an expansion rate of 97.64% in comparison to the preceding year. Similarly, Interloom recorded an impressive growth of 1481.06% in 2018, which may be indicative of aggressive expansion in the market. Furthermore, Andes Food & Beverages exhibited a noteworthy increase of 92.58% in 2018, following a period of declining exports. This trend may be indicative of a recovery in demand or an improvement in the company's commercial strategy. In contrast, Agro Fergi demonstrated a notable surge in its export volume during 2018, following a prolonged period of declining exports. Conversely, Consorcio del Valle ceased exporting baby lima bean in 2017, indicating a potential reevaluation of its business strategy or internal challenges within the company. It is, however, important to highlight that in order to maintain a competitive dynamic in the baby lima bean export market, companies must optimise their strategies in order to remain competitive in a market that is in a state of constant evolution.

TABLE VI
BEBY LIMA BEAN EXPORTING COMPANIES IN THOUSANDS OF USD FOB

Exportadora	2019	2020	2021	2022	2023
Brolem Company	198	701	2,087	2,849	3,843
Interloom	1,395	1,708	1,307	1,299	2,273
Andes Food & Beverage	886	888	1,435	1,540	1,688
Agro Fergi	1,119	859	905	1,049	1,656
Afi Impex Peru					1,131
Del Valle Consortium	38	90	264	501	1,105
Blue Pacific Oils	434	341	1,772	1,646	1,043
Xpodeka	69	14	155	98	977
Geale Agrotrading	265	338	1,017	1,118	832
Blue Market	304	231	343	311	813
Agro Cosecha Paz			252	783	668
Food Export North	172	164	91	641	542
Aplex Trading	1,186	1,228	1,036	1,340	492
MN Peru Foods				470	428
Raw Food Agrobusiness			95	191	408
Other	1,759	1,388	2,366	2,356	1,860

Note. Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

Table VI demonstrates that the Brolem Company became the unchallenged leader in the export of baby lima bean in the period following the recovery from the global pandemic caused by the SARS-CoV-2 virus, maintaining its dominant position until 2023. Interloom is in close contention for the runner-up position, having demonstrated a noteworthy performance and reinforced its standing as a leading exporter. Andes Alimentos & Bebidas occupies the third position, exhibiting a moderate growth in exports by 2023. Agro Fergi occupies the fourth position, exhibiting a relatively stable and consistent export performance. Conversely, Consorcio del Valle exhibited considerable volatility in its export share, with a suspension of exports in 2017. However, it recommenced operations in 2019 at a markedly reduced level, which may be attributed to the nascent post-pandemic phase. Nevertheless, it has been able to partially recover in the following years. Brolem Company and Interloom have established themselves as the principal actors in the baby lima bean export market, while Andes Alimentos & Bebidas and Agro Fergi maintain a notable presence. Despite fluctuations in its export performance, Consorcio del Valle has managed to regain market share.

TABLE VII
IHH OF THE VALUE OF BABY LIMA BEAN BY DESTINATION MARKET

	2014	2015	2016	2017	2018
IHH	1,569	1,553	1,297	1,631	1,249
	2019	**2020**	**2021**	**2022**	**2023**
	1,491	1,398	3,512	3,105	2,775

Note: Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

Table VII illustrates the evolution of the concentration of Peruvian baby lima bean import markets, revealing an intriguing trend. In 2021, the highest level of market concentration is observed, which suggests a greater dependence on certain importing countries. However, high concentration may be a risky strategy, as it implies a high dependence on a few markets. It is therefore encouraging to observe that low concentration is evident in the years 2018 to 2020, indicating a greater diversification of markets and a reduction in dependence on specific countries, such as the United States. In other words, the low concentration in those years indicates that Peruvian baby chicken exports were distributed more widely among different markets, thereby reducing the risk of dependence on a single country. It is therefore important to continue monitoring market concentration in order to ensure the development of a diversified and sustainable export strategy.

Table VIII illustrates the evolution of the concentration of Peruvian baby lima bean exporting companies, which reveals an intriguing trend. In 2017, the highest level of market concentration was observed, indicating a greater reliance on dominant firms in the export of baby lima bean. However, high concentration can be risky, as it implies a high degree of

dependence on a limited number of companies. It is therefore encouraging to observe a sustained decline in the level of concentration in 2019, reaching a relatively low point in 2023. This suggests a greater diversification of exporting companies and a reduction in dependence on specific companies, such as Brolem Company. In other words, the observed decrease in concentration indicates an increase in the number of firms engaged in the export of baby lima bean, which reduces the risk of dependence on a single firm. It is therefore important to highlight that Peruvian baby lima bean is no longer exclusively dependent on Brolem Company for its output to other markets. This development strengthens the competitiveness and sustainability of the sector.

TABLE VIII
IHH OF THE VALUE OF BABY LIMA BEAN BY EXPORTING COMPANY

IHH	**2014**	**2015**	**2016**	**2017**	**2018**
	3,198	2,423	2,737	4,325	2,198
	2019	**2020**	**2021**	**2022**	**2023**
	1,456	1,375	1,166	1,000	928

Note: Registration of SUNAT data obtained through the trade intelligence tool VERITRADE [71]

V. DISCUSSION

In comparison, studies have demonstrated that the high quality and nutritional value of baby lima bean, cultivated in regions such as Lambayeque and Ica, have been instrumental in its global acceptance. The global preference for natural foods has been a significant factor in the increased popularity of baby lima bean, which has gained a notable presence in markets such as the United States, Japan and Spain. Similarly, the rich cultural history of baby lima bean and tourism have contributed to its international recognition, thereby boosting exports as a result of the adoption of good agricultural practices, certifications and government support. These strategies have facilitated access to international markets [5,6,7,8-10].

The exportable supply of baby lima bean has constituted a crucial element of the Peruvian economy. The HHI index of baby hen meat exports and companies over the past ten years has indicated a low level of risk, as new Peruvian exporting companies emerge on a regular basis, exporting to a diverse range of international markets. This has not led to a situation where the supply and demand of baby hen meat are in direct competition with one another. This positive trajectory can be attributed to a number of factors, as highlighted by [42], who emphasised that market diversification and added value are strategies that companies in this sector are adapting in order to maintain a global and competitive position. However, inter-institutional alliances, both public and private, will be crucial in ensuring the sustainability and balance of supply in an increasingly unstable international market following the impact of the global pandemic. Concurrently, postulates [37, 38, 39, 40, 41, 42, 43] acknowledge that by diversifying the exportable offer to disparate foreign markets, economies and companies can become highly attractive, thereby generating employment, improving their economic position and global standing. In light of this, the position espoused by [40, 41] underscores the imperative for countries to implement policies that foster quality education, research, and development. These policies are pivotal in propelling a structural transformation in agricultural sector companies, enhancing productivity and value addition in a sustainable manner, and fostering a global business environment that is both conducive and equitable.

VI. CONCLUSIONS

Over the past ten years, exports of Peruvian baby lima bean have demonstrated a consistent upward trajectory in terms of both FOB value and net weight. This growth reflects Peru's capacity to meet international demand with high-quality products.

The United States represents the primary export destination, followed by Japan, Spain and Canada. These countries represent key strategic markets for Peruvian baby lima bean. The considerable surge in exports to the United States in 2020 evinces the adaptability of Peruvian exporters in response to evolving global market circumstances. It is therefore imperative that export destinations be diversified in order to reduce the risks associated with dependence on a single market. It is imperative that efforts to identify and engage with new markets remain a priority. It is therefore imperative that high-quality standards and sustainable practices in production are maintained in order to ensure the continued success of exports of baby lima bean.

The results of the Herfindahl-Hirschman Index (HHI) indicate an intriguing trend in the diversification of markets for baby lima bean imports. In 2023, a high level of market concentration is observed, with 51 participating countries. This indicates the potential for dependence on certain leading markets, such as the United States, for baby lima bean imports. It is therefore essential to monitor the evolution of the HHI index in order to guarantee that the diversification of importing markets remains at an optimal level, thereby reducing the risk of dependence on specific markets and strengthening the competitiveness of the sector.

Conversely, the Brolem Company occupies a noteworthy position as the foremost exporter of baby lima bean, with Interloom, Andes Alimentos & Bebidas and Agro Fergi following closely behind. These companies have demonstrated the efficacy of their strategies for maintaining high-quality production and export performance in the case of baby lima bean. However, the pandemic provided an opportunity to assess the resilience of these companies in the context of adverse global market conditions. Fortunately, they demonstrated an admirable capacity for adaptation and resilience in the face of adversity. It is therefore imperative to emphasise the significance of diversification amongst exporting firms, with the objective of reducing the risks associated with excessive

dependence on a limited number of markets. In this regard, the incorporation of nascent enterprises is vital to sustain a competitive market dynamic. It is therefore essential to implement strategies such as optimising production processes, maintaining high product quality and diversifying markets in order to ensure the continued success of baby lima bean exports.

The results of the Herfindahl-Hirschman Index (HHI) indicate a favourable trajectory in the diversification of baby lima bean exporting companies. In 2023, the market exhibited a low level of concentration, with 33 participating companies, indicating highly dynamic competition within the sector. It is evident that the export of baby lima bean is not reliant on a single entity, such as Brolem Company, which mitigates the risk of dependency and enhances the resilience of the sector. The diversification of exporting companies is a crucial factor in the success and sustainability of baby lima bean exports. Innovation, efficiency and continuous improvement are key drivers of this success, and ultimately benefit consumers and the sector as a whole. It is therefore imperative to maintain surveillance of the HHI index in order to guarantee that the diversification of exporting companies remains at an optimal level.

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