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The King of Fruits: Unveiling Market Structure and Comparative Advantage in Global Durian Trade

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Abstract

The rapid expansion of global durian trade has reshaped export market structures and the competitive positions of exporting countries. However, the persistence of comparative advantage and changes in market concentration remain insufficiently explored. This study aims to examine global durian export performance, market concentration, comparative advantage, and its persistence over the period 2002–2025. The study employs the Herfindahl-Hirschman Index (HHI), Concentration Ratios (CR4 and CR8), Revealed Comparative Advantage (RCA), RCA stability analysis, and Kaplan-Meier survival estimation with annual trade data for a total of 65 countries and territories. The results found that the strong growth in global durian exports, but market concentration remained high throughout. The average HHI rose from 4,456 in 2002–2009 to 6,514 in 2018–2025, while CR4 and CR8 approached 100%, showing the continued dominance of a few exporters. Thailand had the strongest comparative advantage over the whole period of the study, while Vietnam was emerging as a more competitive exporter. By contrast the comparative advantages of Hong Kong SAR and Malaysia deteriorated. The RCA stability analysis suggests a high degree of persistence of export specialization, although this pattern is partially driven by dominant exporters. Further, exploratory Kaplan–Meier estimates suggested that comparative advantage survival also differed across major exporting countries. These results underscore the coexistence of increasing global trade, persistent market concentration, and nonuniform comparative advantage.The study highlights the need to increase export capacities, improve supply chain performance and diversify export markets for sustained competitiveness in the global durian industry.

Keywords: Durian trade, Competitiveness, Export concentration, Stability-Test, Survival Estimation.

Introduction

The durian is a fruit of high value in world trade. It is popularly known as the "King of Fruits" for its sweet, delicious taste and pungent odor, but it is also characterized by strong consumer demand (Siriphanich, 2011). The demand for durian continues to increase and influences the global export performance (UN Comtrade, 2026). The growing demand creates new opportunities for tropical fruit producers and changes the economic value of durian in the regional and international markets. The increase in consumption in Asia and the enhancement of trade relations have made the trade in tropical fruits increasingly important, and durian is an important commodity (FAO, 2026). The high demand for this fruit has also led to the development of new varieties, improvements in production quality, and commercial breakthroughs (Chomdej et al., 2026). With the growth of international trade, durian has not only been limited to traditional growing areas, but has also entered the ever-expanding global agricultural market. Moreover, this development has prompted producing countries to strengthen their export capacity, to improve the quality of products and to increase their presence in international markets. Thus, the increasing economic role of durian has led to more intense competition among the exporting countries. Therefore, market positioning and comparative advantage become more relevant in understanding the dynamics of the global durian trade.

The global trade in durians is increasing, which implicates the competition among exporting countries. Thailand has long been a dominant player in global markets because of its well-established production systems, export infrastructure, and strong commercial relationships, especially with China. However, Vietnam has become an increasingly important competitor, and Malaysia and other producing countries continue to strengthen their export positions. Noodaeng (2017) and Sukloet (2021) pointed out the superiority of Thailand's comparative advantage in the Chinese market based on existing trade relations and market access. More recently, Chaiyapol et al., (2026) found that Vietnam's increased competition did not weaken Thailand's export specialization. The results show that the increase in international demand has affected the competitive position of exporting countries. However, the growth of international trade raises the question of whether export opportunities are becoming more widely available or still concentrated in a small number of dominant suppliers.

The changing competitive landscape also points to the distinction between market concentration and comparative advantage. Countries could dominate international markets through the scale of production, infrastructure, and existing trade networks without necessarily displaying stronger export specialization. Cadot et al., (2011) showed that export concentration and diversification change with economic development, suggesting that changes in market structure may be indicative of more general trends in international competitiveness. Another key challenge beyond such dimensions is maintaining export participation over time. Besedeš & Prusa (2006) document that international trade relationships are typically fairly short-lived, suggesting that market entry does not ensure long-run participation. Peterson et al., (2018) also point to the importance of market conditions and sanitary and phytosanitary requirements for survival in export markets for fresh fruits and vegetables. In a similar veinEngemann et al., (2023) find that the quality of institutions is important for the stability of agricultural trade relationships. These findings are especially important for durian, which is perishable, produced seasonally and requires reliable distribution systems. Therefore, understanding global durian

trade requires consideration of market concentration, comparative advantage, and the persistence of export participation.

The increasing economic significance of durian has not been matched by an understanding of how the global market structure and export competitiveness have evolved. The evidence that is available today gives us poor insights into the joint evolution of market concentration, comparative advantage, and export participation across exporting countries over a long period. In particular, it is unclear whether the growing global trade in durians has led to a reduction in market concentration, strengthened the comparative advantage of emerging exporters, or increased the stability of export participation. The present study attempts to fill these gaps by examining the evolution of market concentration, comparative advantage and export stability in global durian trade from 2002 to 2025. The contribution of the present study is the integration of market structure, export specialization and export survival in a comprehensive global assessment, which provides a better differentiation between market dominance and sustainable competitiveness. The study contributes to a wider understanding of competitive dynamics in international agricultural trade, moving beyond individual exporting countries and bilateral markets. The findings are expected to provide practical insights for export diversification, market development and long-term competitiveness of durian-producing countries.

Literature Review

International trade is an important factor in the competitiveness of agricultural commodities, especially as world markets become more global. The increase of agricultural trade opens up new opportunities for producing countries, but also increases competition, changes market structures, and increases dependence on international demand. These developments have led to research on the distribution of export opportunities and the dynamics of market concentration. Cadot et al., (2011) Investigated export diversification for 156 countries and showed that export structures tend to diversify before they become more concentrated as economies develop. Chuasuwan et al. (2023) examined the potential of durian exports from Thailand and Vietnam within the tropical fruit trade, noting distinctions in production capacity, supporting industries, and market conditions that affect competitiveness. Rangkakulnuwat, (2024) also examined the relationship between Thailand's exports of durian and mangosteen to the global market, investigating the interdependence of the tropical fruit trade. Recently, García Juárez et al. (2025) studied the global exports of table grapes, finding that the main exporting countries differ in their market diversification and competitiveness. These studies suggest that agricultural export growth is accompanied by changes in market structure and competitive positions, although the long-term distribution of global durian export shares remains insufficiently explored.

Comparative advantage has become another important focus in the literature on agricultural trade competitiveness. Market concentration is about the distribution of export shares, whereas comparative advantage gives an idea of the relative specialization of countries in international markets. The Revealed Comparative Advantage (RCA) index, developed by Balassa (1965), measures export specialization based on visible trade patterns, although Vollrath (1991) has suggested alternative measures of revealed competitiveness. Later empirical implementations of these methods to agricultural commodities have demonstrated

differences in competitive performance across countries and markets. Thailand continued to enjoy a comparative advantage in exporting fresh durian to China in terms of exports because of well-established trade relationships and market access, as noted by Noodaeng (2017). Sukloet (2021) also pointed out the significance of commercial partnerships and market development for enhancing Thailand's export competitiveness. (Budiarto & Pratita, 2022) studied the competitiveness of citrus exports in Southeast Asia. They found differences in comparative advantage among the major exporters. More recently, Chaiyapol et al., (2026) found that Thailand remained more specialized in durian exports than Vietnam, in spite of increasing competitive pressure. These findings indicate that comparative advantage could change as markets develop. However, existing durian studies have predominantly focused on bilateral trade relationships, not on global exporter competitiveness.

Research on agricultural trade has also shifted from export performance to consider the stability and persistence of international trade relationships. This is particularly the case for perishable agricultural products which are still being exported, where access to world markets is affected by the continuity of production, quality standards and distribution systems. Besedaš and Prusa (2006) show that international trade relationships often break down within relatively short time periods, i.e. market entry does not necessarily imply sustained engagement . Bojnec and Fertő (2012) extended this discussion to agricultural trade and showed that European Union enlargement was associated with longer export durations for agri-food products from new member states. Peterson et al. (2018) later analyzed fresh fruit and vegetable exports to the United States and found the importance of market conditions and sanitary and phytosanitary requirements for export survival. The importance of institutional quality and similarity between trading partners for the sustainability of agri-food trade relationships has recently been pointed out by Engemann et al., (2023). These studies show that agricultural trade research is shifting from measuring export performance to measuring persistence of market participation. However, there is limited evidence on the global durian export market stability, especially with market concentration and comparative advantage. It implies that there is a need for more holistic assessments of the evolution of export dominance, specialization and sustained participation among durian exporting countries.

Methodology

Technique Analysis

This research uses a descriptive quantitative approach with a longitudinal analysis to analyze the dynamics of market structure, export concentration, comparative advantage and competitiveness of durian in international trade during the period 2002-2025. The analytical techniques are: Herfindahl-Hirschman Index (HHI), Concentration Ratio (CR4 and CR8), Revealed Comparative Advantage (RCA), RCA Stability Analysis and Kaplan-Meier Survival Analysis. The indicators are designed to give a full picture of how the structure of global durian trade, the leadership of exporting countries and the stability and sustainability of comparative advantage change over time.

The concentration level of durian exports among countries in the world market is analyzed by measuring the concentration of the export market using the Herfindahl-Hirschman

Index (HHI). HHI is calculated as the sum of squares of each country's share of exports, and ranges from 0 to 10,000. The HHI is mathematically defined as follows:

$$HHI_t = 10000 \times \sum(X_{it}/X_{wt})^2 \quad (1)$$

Where: HHIt represents the market concentration level in year t; Xit is the value of durian exports from country i in year t; and XWt is the total global durian export value in the same year. A higher HHI value indicates that export shares are increasingly concentrated among a small number of exporting countries. Conversely, a lower HHI value indicates a more even distribution of market shares. As a complementary indicator, this study uses the Concentration Ratio (CR4 and CR8) to measure the accumulated market share of the four and eight largest exporting countries. The formula is:

$$CR_{kt} = 100 \times \sum(X_{it}/X_{wt}), \quad \text{for i = 1 to k} \quad (2)$$

Where k = 4 for CR4 and k = 8 for CR8. Exporting countries are ranked by export value for each year of observation. The values of both indicators are expressed as percentages. The HHI, CR4, and CR8 were calculated annually and then averaged across three observation periods: 2002–2009, 2010–2017, and 2018–2025. An overall result for the 2002–2025 period was also calculated based on the average of the annual indicators over the 24-year span.

To measure comparative advantage, this study employs the Revealed Comparative Advantage (RCA) index introduced by Balassa (1965). The RCA index compares the contribution of durian exports to a country's total exports against the contribution of the same commodity to total world exports. The RCA is formulated as follows:

$$RCA_{it} = \frac{X_{idt}/X_{iTt}}{X_{Wdt}/X_{WTt}} \quad (3)$$

Where Xidt represents durian exports from country i; XiTt represents total exports of all commodities from country i; XWdt represents global durian exports; and XWTt represents total global exports of all commodities, all in year t. An RCA value greater than 1 indicates that the country possesses a revealed comparative advantage in durian trade, whereas an RCA value of 1 or less indicates the absence of such an advantage. The analysis is conducted on both an annual and inter-period basis to identify shifts in the competitiveness of major exporting countries. Also, RCA stability analysis is employed in assessing the persistence of the comparative advantage over the period of the study. The approach is based on the analysis of trade characteristics stability developed by Dalum et al. (1998). We estimate RCA stability by looking at the relationship between a country's RCA value for a given year and its RCA value for a number of years prior, using the following equation

$$RCA_{it} = \alpha k + \beta k RCA_{i,t-k} + \varepsilon_{i,t} \quad (4)$$

Where αk is the constant, βk is the RCA persistence coefficient at lag k, and εi,t is the error term. Testing is performed for lags ranging from 1 to 23 years, utilizing available observation pairs. The estimation results are presented via coefficients α and β, p-values, the coefficient of determination (R-Squared), the correlation coefficient (R), the β/R ratio, and the number of observations (N). The β coefficient is used to describe the relative persistence of RCA, while R and R^2 provide information on the strength of the relationship between years. To examine the sensitivity of the results to the dominance of major exporters, the estimates are

also compared against specifications that account for dominant exporting countries. This analysis is diagnostic in nature and is not intended to identify causal relationships.

The final analysis employs the Kaplan-Meier Survival Analysis developed by Kaplan and Meier (1958) to assess the duration of comparative advantage among durian-exporting countries. A survival approach in international trade research has also been utilized by Besedeš and Prusa (2006). In this study, a "survival" condition is defined as a period during which a country maintains an RCA > 1, while a "failure event" is defined as the transition from RCA > 1 to RCA ≤ 1. The Kaplan–Meier survival function is formulated as follows:

$$S(d) = \pi[1 - \left(\frac{e_j}{n_j}\right)], \text{ for all event times dj} \leq \text{d} \quad (5)$$

Where: S(d) represents the estimated probability of maintaining comparative advantage up to duration d; ej is the number of instances where the advantage was lost at time j; and nj is the number of episodes still at risk before that event time. The analysis focuses on four major exporters: Thailand, Hong Kong SAR (China), Malaysia, and Vietnam. Countries that maintain an RCA > 1 through the end of the observation period are treated as right-censored observations. Observations that cease due to a lack of data are also censored at the last year for which usable data exists. Episodes ongoing at the start of the observation period are distinguished from new episodes because the initial year of comparative advantage is unknown. Given the limited number of episodes, Kaplan–Meier results are used as an exploratory analysis to illustrate the persistence of comparative advantage, rather than as a basis for robust statistical inference.

Data and It Sources

This study utilizes secondary international trade data covering the period from 2002 to 2025, comprising 24 annual observations. The units of analysis are countries or economic regions recorded as durian exporters in international trade. The dataset includes 65 countries/regions and is arranged as a country-year panel. The commodity studied is fresh durian, with the six-digit Harmonized System (HS) 081060. The classification was used to ensure a consistent product coverage over the study period. The trade data consist of durian export values for each country, global durian exports, total exports of all commodities for each country, and global exports of all commodities. All trade figures are based on nominal values. Trade figures are based on United States Dollars (USD). Data were compiled and processed from the UN Comtrade to generate several indicators such as market share, HHI, CR4, CR8, and RCA. Annual RCA data series for each country are used for stability analysis. Survival analysis studies the change of RCA status relative to the comparative advantage threshold.

For the comparative analysis, the study period is divided into three equal length intervals: Period I (2002–2009), Period II (2010–2017) and Period III (2018–2025). This segmentation allows for the assessment of gradual changes in market structure and comparative advantage, while stability and survival tests continue to rely on annual data. Prior to processing, the data were checked for accuracy of country identity, trade value units, consistency of commodity classification and completeness of observations. Missing values are treated as missing and not automatically assumed to be zero-value exports. The results are interpreted with due consideration of data limitations for Vietnam for 2024-2025, especially when analyzing market concentration and sustainability of comparative advantage. The results of the

study are presented in the form of comparative tables and visualizations of annual trends for identifying the structural changes and dynamics of the competitiveness of global durian trade.

Results

The global durian export value and its growth trend between 2002 and 2025 is shown in Figure 1. Generally, the value of global durian exports has significantly trended upward, especially since 2014. The global durian trade was relatively small in 2002–2013, with slow growth of export value. The value of exports has been steadily increasing from 2014 to 2020, with an acceleration in the latter period. Trade peaked at some USD 6.6 billion in 2023, before falling to some USD 4 billion in 2024 and 2025.These developments indicate the increasing importance of durian as a horticultural commodity in international trade, despite the fluctuation of export value toward the end of the observation period. The annual growth of the global durian exports had more volatile dynamics compared to the export values. The growth rate was different from year to year, although for most of the study period the growth was positive. There were major increases in a number of years including 2023 while 2024 and 2025 saw negative growth. This pattern indicates that the expansion of the global durian trade has not been smooth over the years.These findings provide the basis for further analysis as to whether the growth in trade value was associated with changes in market concentration and changes in the comparative advantages of the main exporting countries.

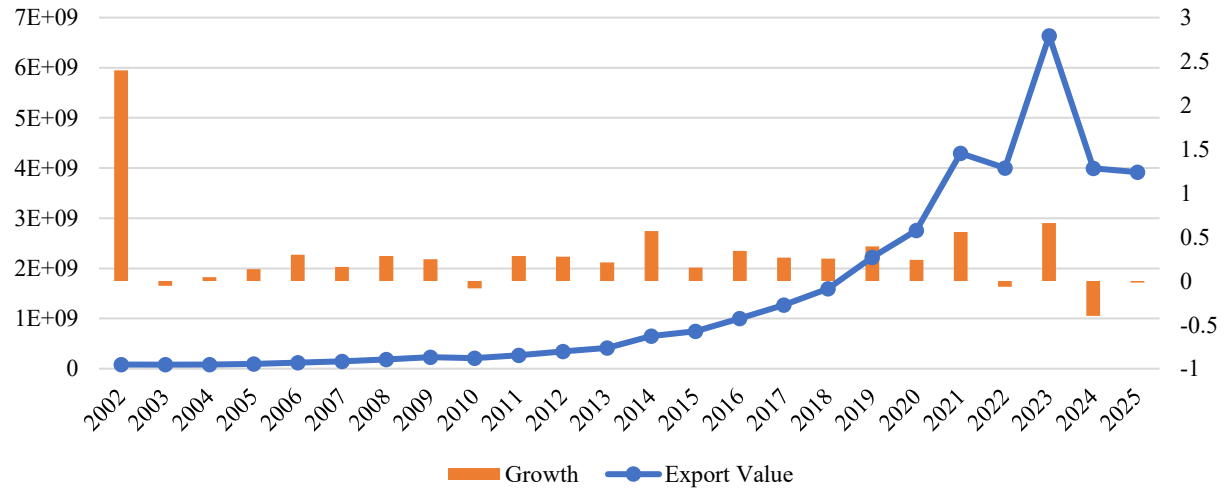

Figure 1. The Evolution of Global Durian Exports from Period 2002-2025

Source: UN Comtrade (2026)

Table 1 presents the structural changes and dominance of durian-exporting countries in the global market for the period 2002–2025. From 2002 to 2009, Thailand and Hong Kong SAR dominated the global durian trade, accounting for 51.54% and 42.61% of total export shares respectively, whereas Malaysia only had 4.63%. The large combined shares of Thailand and Hong Kong SAR, amounting to 94.15%, suggest that the world's durian exports were heavily reliant on these two trading economies in the first period. The dominance indicates that

there are only a few other countries that are engaged in the global durian export market and the export market shares were relatively concentrated.

The two major exporters continued to dominate the market during 2010-2017, but the share of Hong Kong SAR was reduced to 34.79% while the share of Thailand increased to 54.06%. During this period, Viet Nam became a major exporter, making up 8.92% of global exports and ranking third in the world. This development indicates the gradual diversification of the global durian export landscape, in particular the emergence of new exporting countries that can strengthen their positions in international trade. But Thailand and Hong Kong SAR together still accounted for a large share. Thus, the market structure had not fundamentally changed from its dependence on the dominant exporters.

There were more substantive structural changes over the 2018–2025 period, notably the increasing export dominance of Thailand and the rapid expansion of Viet Nam. Thailand's share of the market jumped to 77.86% while Viet Nam moved up to second spot with 10.54% ahead of Hong Kong SAR, whose share fell to 10.27%. Thailand's share has grown considerably to reflect a rising dominance of the world durian export market. The increasing contribution of Viet Nam meanwhile shows the country's growing role in the international durian trade and the emergence of a stronger competitive position among Southeast Asian exporters. In contrast, the declining share of Hong Kong SAR is indicative of its relative loss of its previous position in the global export structure.

During the observation period (2002-2025), Thailand was the biggest durian exporter in the world accounting for 73.79% of the world's durian exports, followed by Hong Kong SAR (14.62%) and Viet Nam (10.01%). These three countries accounted for approximately 98.42% of total exports. This implies a very unequal distribution of market shares between the exporting countries. The pattern reveals that the global trade in durians has not always expanded with a more equal distribution of export opportunities. Thailand has become the more dominant player and Vietnam an emerging competitor. The global durian export market has moved from a market structure dominated by Thailand and Hong Kong SAR to one in which Thailand is increasingly dominant, with Viet Nam gradually emerging as a major exporter..

From Table 2, it can be seen that during the entire study period, the structure of the global durian export market was highly concentrated. The Herfindahl–Hirschman Index (HHI) increased from 4,456 in the period 2002–2009 to 4,589 in the period 2010–2017, then significantly to 6,514 in the period 2018–2025. The increase of HHI indicates the export market shares were increasingly concentrated in a small number of countries, especially in the last period. A market is highly concentrated if the HHI index is over 2,500. Thus, all three periods of observation display a consistently high level of market concentration, with the last period of observation displaying the highest concentration.

The magnitude of increase in HHI from the first to the second period was relatively small, implying that the overall market structure was relatively stable, despite the presence of Viet Nam as an additional major exporter. However, the significant increase in the third period is due to a stronger concentration of export market share, mainly due to the increasing dominance of Thailand. This is consistent with the changes shown in Table 1 where the export share of Thailand increased from 54.06% in 2010–2017 to 77.86% in 2018–2025. Thus, the growing concentration of the global durian export market appears to be more related to the

strengthening market position of the main exporter, rather than just a reduction in the number of participating countries.

These results are also confirmed by the Concentration Ratio indicators, in particular CR4 and CR8, which were close to 100% during the whole period under review. CR4 values increased from 99% in 2002–2009 to 100% in the subsequent periods, whereas CR8 was constantly 100%. The results reveal that the four largest exporting countries controlled almost the entire value of global durian exports, while the eight largest exporters controlled almost the entire market. Such a distribution reflects limited market participation by smaller exporting countries and implies that their contribution to world trade remains relatively marginal. This could create significant barriers for smaller countries in increasing their share in international durian markets, especially in obtaining market access, export distribution networks and international buyers because of the dominance of major exporters.

Interestingly, the average number of countries of export increased from 20 in 2002-2009 to 24 in 2010-2017 and 31 in 2018-2025. The development indicates that the participation in the world durian trade increased over time. But the increase in the number of exporters and the HHI value at the same time suggests a substantial difference between market participation and market competitiveness. The export market is getting more countries, but this has not altered the distribution of export shares significantly. The export value is still concentrated in a few dominant countries. Hence an increase in the number of exporting countries does not necessarily lead to a decrease in market concentration or a more balanced competitive environment. The global durian export market is usually quite concentrated. At the same time, the growing domination of major exporters is accompanied by wider participation of smaller exporting countries.

Figure 2 shows the trend of global durian export market concentration and the number of durian exporting countries from 2002 to 2025. The value of Herfindahl–Hirschman Index (HHI) generally has a fluctuating trend with an upward trend, especially after the year 2018. The degree of concentration was fairly stable from 2002 to 2017 with some fluctuations from year to year. HHI value increased from 2018 to 2022 but declined in 2023 and increased sharply in 2024-2025. However, the number of exporting countries was increasing in the observed period, from about 16 countries in 2002 to about 29 countries in 2025, with the highest number in 2018.

Table 1. The Top 10th Leading Durian Exporting Countries in Global Markets, 2002-2025

Rank	2002-2009		2010-2017		2018-2025		2002-2025	
	Country	Shares (%)	Country	Shares (%)	Country	Shares (%)	Country	Shares (%)
1	Thailand	51.54%	Thailand	54.06%	Thailand	77.86%	Thailand	73.79%
2	China, Hong Kong SAR	42.61%	China, Hong Kong SAR	34.79%	Viet Nam	10.54%	China, Hong Kong SAR	14.62%
3	Malaysia	4.63%	Viet Nam	8.92%	China, Hong Kong SAR	10.27%	Viet Nam	10.01%
4	Netherlands	0.60%	Malaysia	1.98%	Malaysia	0.97%	Malaysia	1.21%
5	Spain	0.25%	Netherlands	0.13%	Philippines	0.19%	Philippines	0.16%
6	Ecuador	0.11%	Indonesia	0.02%	Lao People's Dem. Rep.	0.08%	Lao People's Dem. Rep.	0.07%
7	Singapore	0.08%	Belgium	0.02%	Netherlands	0.03%	Netherlands	0.06%
8	France	0.07%	Egypt	0.01%	Indonesia	0.02%	Indonesia	0.02%
9	Belgium	0.04%	Philippines	0.01%	Czechia	0.01%	Spain	0.01%
10	USA	0.01%	Singapore	0.01%	France	0.00%	Czechia	0.01%

Source: Author Calculation (2026)

Table 2. Global Durian Export Market Structure

Indicator	2002–2009	2010–2017	2018–2025	2002–2025
HHI (0–10,000)	4456	4589	6514	5186
CR4 (%)	99	100	100	100
CR8 (%)	100	100	100	100
Average Number of Exporters	20	24	31	25
Market Structure Conclusion	Highly Concentrated	Highly Concentrated	Highly Concentrated	Highly Concentrated

Source: Author Calculation (2026)

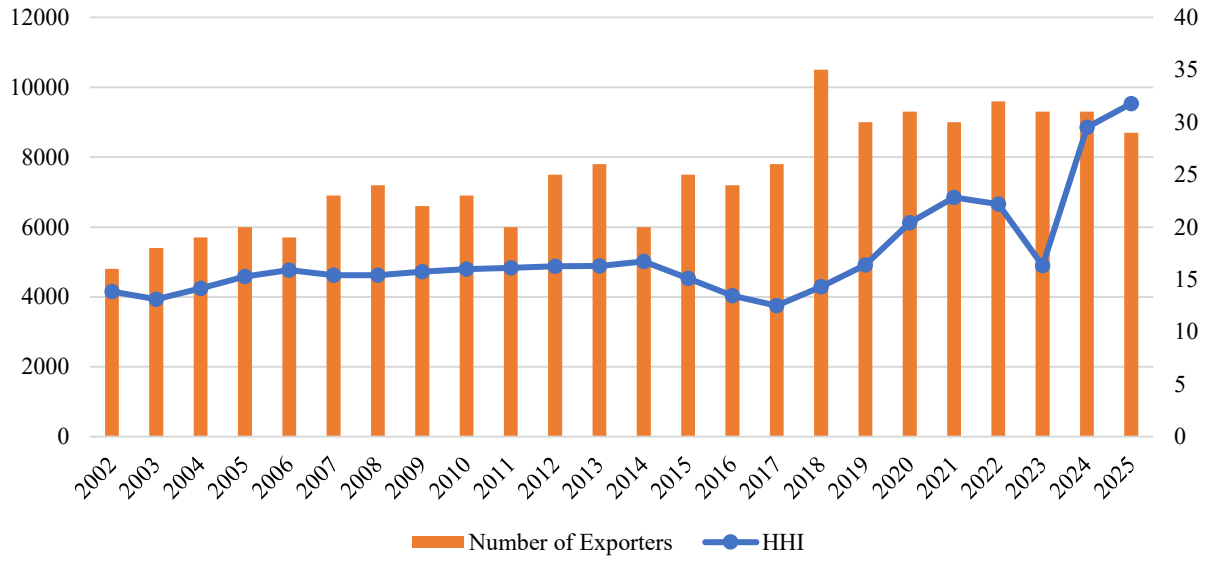

Figure 2. Dynamics of Global Durian Export Concentration, 2002-2025

Source: Author Calculation (2026)

These trends suggest that increased country participation in the global durian trade has not necessarily lead to a more equitable market share distribution. Conversely, export concentration has stayed high, even as the number of countries involved in international trade has increased. These findings point to an imbalance in market dominance between major exporters and countries with relatively minor export contributions.

Table 3 shows the dynamics of the comparative advantage of durian exporting countries in the world market for 2002–2025 based on the index of Revealed Comparative Advantage (RCA). Thailand always had the highest comparative advantage, although the RCA value changed between periods, from 45.89 in 2002–2009 to 42.87 in 2010–2017, and then increased to 58.19 in 2018–2025. By contrast, Hong Kong SAR recorded a continuous decline in RCA from 15.27 to 12.86 and then 4.23 in the last period. The RCA of Malaysia also exhibited a weakening of comparative advantage, with the value declining from 3.98 in the first period to 0.71 in the third period, indicating a loss of comparative advantage. Vietnam had the comparative advantage with the RCA value of 4.12 to become an exporter in the period 2010-2017. This change is an indication of the competitive position change between durian exporting countries. However, Thailand still has a much higher advantage compared with other countries. Thailand had the highest average RCA of 48.98 during 2002–2025, followed by Hong Kong SAR with 10.79 and Malaysia with 2.18. Other countries, such as Ecuador, the Philippines, the Netherlands, Spain, Egypt, the Dominican Republic and Singapore, however, have an average RCA below one, which means that there is no overall revealed comparative advantage. The results suggest that the comparative advantage in the global durian trade is still concentrated in a few exporters, mainly Thailand. In addition, the decline in RCA for some of the major exporters indicates that trade dominance is not necessarily associated with the ability to sustain the same comparative advantage over time. This condition means that the dynamics of competitiveness among countries are different and must be taken into account in understanding the changes in the structure of international durian trade.

Table 3. The Top 10th Exporting Countries with Highest Comparative Advantage, 2002-2025

Rank	2002-2009		2010-2017		2018-2025		2002-2025	
	Country	RCA	Country	RCA	Country	RCA	Country	RCA
1	Thailand	45.89	Thailand	42.87	Thailand	58.19	Thailand	48.98
2	China, Hong Kong SAR	15.27	China, Hong Kong SAR	12.86	China, Hong Kong SAR	4.23	China, Hong Kong SAR	10.79
3	Malaysia	3.98	Viet Nam	4.12	Malaysia	0.71	Malaysia	2.18
4	Ecuador	2.09	Malaysia	1.83	Philippines	0.51	Ecuador	0.70
5	Netherlands	0.19	Brunei Darussalam	0.18	Indonesia	0.02	Philippines	0.18
6	Spain	0.14	Egypt	0.12	Dominican Rep.	0.01	Netherlands	0.08
7	Singapore	0.05	Cambodia	0.08	Netherlands	0.01	Spain	0.05
8	Uganda	0.04	Netherlands	0.06	Czechia	0.01	Egypt	0.04
9	Jamaica	0.04	Dominican Rep.	0.05	Colombia	0.00	Dominican Rep.	0.02
10	Greece	0.03	Philippines	0.03	Spain	0.00	Singapore	0.02

Source: Author Calculation (2026)

Table 4 shows changes in market leadership and comparative advantage of the world's five main durian exporters between the periods 2002–2009 and 2018–2025. Thailand showed strengthening of its most dominant market position with an increase in export share from 50.84% to 77.02% or an increase of 26.18 percentage points. This strengthening was also followed by an increase in RCA from 45.89 to 58.19, which shows Thailand's ability to maintain its comparative advantage. In contrast, the Hong Kong SAR experienced a decline in market share by 29.83 percentage points and its RCA fell from 15.27 to 4.23. However, the average RCA across periods still shows that the Hong Kong SAR has a comparative advantage. The most significant changes were in Vietnam, where the export share rose from 0.01% to 12.15% and the RCA rose from 0.02 to 8.31. This development indicates to the emergence of Vietnam as the durian exporter with comparative advantage in the global market. At the same time, the market position of Malaysia deteriorated as its export share fell from 5.49% to 1.05% and the RCA decreased from 3.98 to 0.71. This condition shows the change of Malaysia from a country with comparative advantage to a country without comparative advantage as revealed based on the average observation period. The Philippines experienced an increase in market share and RCA, although the RCA value in the last period was still below one. In general, these results indicate a shift in the leadership structure of the global durian trade, with the strengthening of Thailand’s dominance, the increasing role of Vietnam and the diminishing relative contribution of Hong Kong SAR and Malaysia. These changes also show that market share control and comparative advantage have different dynamics between exporting countries.

Table 4. Changes in Global Durian Export Market Leadership and Revealed Comparative Advantage (5 Countries), 2002–2025

Exporting Country	Market Share (2002-2009)	Market Share (2018-2025)	Δ Share (pp)	RCA (2002-2009)	RCA (2018-2025)	Δ RCA	RCA Status
Thailand	50.84	77.02	26.18	45.89	58.19	0.27	Sustained Advantage
Hong Kong SAR, China	42.28	12.45	-29.83	15.27	4.23	-0.72	Sustained Advantage
Viet Nam	0.01	12.15	12.15	0.02	8.31	439.65	Emerging Advantage
Malaysia	5.49	1.05	-4.45	3.98	0.71	-0.82	Lost Advantage
Philippines	0.00	0.17	0.17	0.01	0.51	48.93	Persistent Disadvantage

Source: Author Calculation (2026)

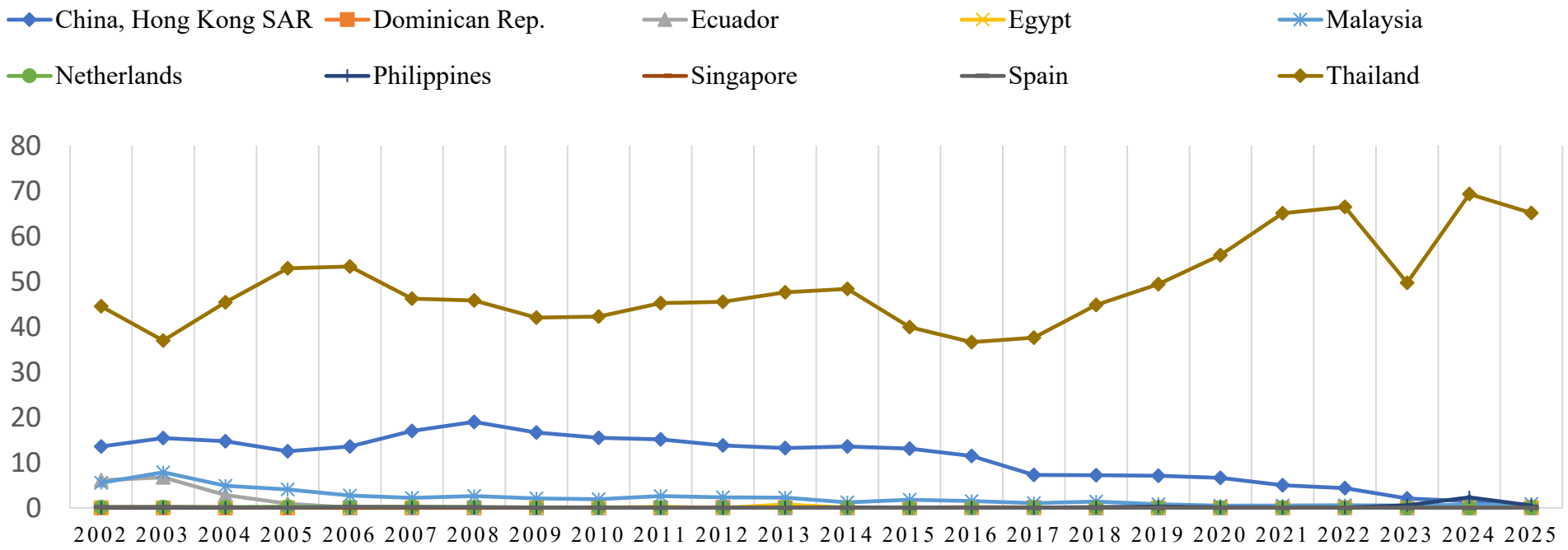

Figure 3. Evolution of Revealed Comparative Advantage among Major Durian Exporters, 2002–2025

Source: Author Calculation (2026)

The trend of comparative advantages of ten durian exporting countries over the period 2002–2025 is shown in Figure 3, using the Revealed Comparative Advantage (RCA) index. Thailand had the highest comparative advantage during the research period. The RCA value fluctuated but tended to increase, from 44.50 in 2002 to 65.09 in 2025. After 2018, a quite sharp increase was observed, with the highest value of RCA in 2024 at 69.29 . In contrast, the Hong Kong SAR has a continuous decreasing trend of RCA, from 13.52 in 2002 to 0.11 in 2025, meaning its comparative advantage is decreasing and below the threshold of RCA = 1. Malaysia is also experiencing a decline from 5.50 to 0.83 and losing comparative advantage since 2019. Meanwhile Ecuador exhibits a fairly large weakening of the RCA relative to the beginning of the period, while the Philippines exhibits episodic increase, though not yet able to. keeps RCA over one all the time. Other countries like the Netherlands, Spain, Egypt, the Dominican Republic, Singapore generally have relatively low RCA values. These findings indicate the existence of a fairly large gap in the comparative advantage between Thailand and other exporting countries and they indicate the changes in the comparative advantage of global durian trade experienced by the countries during the observation period.

Table 5 shows the stability of revealed symmetric comparative advantage (RSCA) in the global durian trade over 23 lag periods. The results suggest a strong persistence of export competitiveness in the short run as evidenced by the relatively high regression coefficient

Table 5. Stability Test of RCA

Lag	α	β	p-value	R-squared	R	B/R	N
1	-0.04	0.96	0.00	0.93	0.96	0.99	1429
2	-0.06	0.93	0.00	0.88	0.94	0.99	1361
3	-0.09	0.90	0.00	0.83	0.91	0.99	1297
4	-0.11	0.88	0.00	0.79	0.89	0.99	1234
5	-0.11	0.87	0.00	0.78	0.88	0.99	1170
6	-0.12	0.86	0.00	0.75	0.87	1.00	1104
7	-0.13	0.85	0.00	0.72	0.85	1.00	1039
8	-0.15	0.83	0.00	0.68	0.83	1.01	977
9	-0.16	0.81	0.00	0.65	0.81	1.01	913
10	-0.18	0.80	0.00	0.64	0.80	1.00	849
11	-0.20	0.78	0.00	0.62	0.79	0.99	786
12	-0.22	0.76	0.00	0.61	0.78	0.97	723
13	-0.24	0.74	0.00	0.60	0.77	0.96	660
14	-0.26	0.72	0.00	0.58	0.76	0.95	597
15	-0.28	0.70	0.00	0.57	0.75	0.93	535
16	-0.29	0.69	0.00	0.57	0.75	0.91	472
17	-0.33	0.65	0.00	0.55	0.74	0.88	412
18	-0.36	0.62	0.00	0.53	0.73	0.86	351
19	-0.39	0.59	0.00	0.50	0.71	0.84	290
20	-0.43	0.55	0.00	0.46	0.67	0.82	228
21	-0.47	0.50	0.00	0.42	0.65	0.78	168
22	-0.51	0.47	0.00	0.45	0.67	0.70	108
23	-0.56	0.43	0.00	0.45	0.67	0.64	52

Source: Author Calculation (2026)

Table 6. Kaplan–Meier Survival Estimates of Revealed Comparative Advantage in Four Major Durian Exporters, 2002–2025

Year	Survival Function	Thailand	China, Hong Kong SAR	Malaysia
2002	0.86	1.00	1.00	1.00
2003	0.86	1.00	1.00	1.00
2004	0.71	1.00	1.00	1.00
2005	0.57	1.00	1.00	1.00
2006	0.57	1.00	1.00	1.00
2007	0.57	1.00	1.00	1.00
2008	0.57	1.00	1.00	1.00
2009	0.57	1.00	1.00	1.00
2010	0.57	1.00	1.00	1.00
2011	0.57	1.00	1.00	1.00
2012	0.57	1.00	1.00	1.00
2013	0.57	1.00	1.00	1.00
2014	0.57	1.00	1.00	1.00
2015	0.57	1.00	1.00	1.00
2016	0.57	1.00	1.00	1.00
2017	0.57	1.00	1.00	1.00
2018	0.38	1.00	1.00	1.00
2019	0.38	1.00	1.00	1.00
2020	0.38	1.00	1.00	1.00
2021	0.38	1.00	1.00	1.00
2022	0.38	1.00	1.00	1.00
2023	0.38	1.00	1.00	1.00
2024	0.19	1.00	1.00	1.00
2025	0.19	1.00	1.00	1.00
Log-rank	0.74			
Wilcoxon	0.84			

Source: Author Calculation (2026)

(β= 0.96) and explanatory power (R2 = 0.93) at the first lag. However, with increasing lag the stability coefficient decreases gradually to β = 0.43 and R2 = 0.45 at the twenty-third lag. All of the estimated coefficients are statistically significant ($p < 0.01$), suggesting a persistent relationship between comparative advantage in the past and in the future. Furthermore, the ratio β/R oscillates around unity in the earlier lag periods and then drops to 0.64 at the last lag. The results show a tendency toward a convergence of comparative advantage, rather than an increasing specialization, since the estimated beta coefficients are generally in the interval between zero and one.To summarize, the results indicate that the global durian market has relatively stable competitiveness in the short term, but its stability decreases in the long term, which means a slow change of the international competitive structure.

The Kaplan–Meier survival estimates of comparative advantage in the global durian trade for the observation period of 2002–2025 are presented in Table 6. The results show that the survival function is decreasing. It means that the probability of keeping the comparative advantage is decreasing with duration. The estimated probability of survival is .86 at baseline, .71 in the third survival period, and .57 in the fourth survival period. The survival function is then relatively stable around 0.57 for several periods, before it falls to 0.38 and finally to 0.19 in the last periods. This implies that the global durian market is still challenging in terms of sustaining comparative advantage in the long run. We find that three countries have the longest durations of comparative advantage observed: Thailand, Hong Kong SAR, and Malaysia. Also, the Log-rank (p=0.74) and Wilcoxon (p=0.84) tests do not show statistically significant differences in the distributions of survival functions between the groups under study. Taken together, the results suggest that long-term comparative advantage is less persistent than short-term competitiveness, highlighting the importance of maintaining export specialization and strengthening market positioning over time.

Discussion

The research findings described above show that Asian countries hold a high share of the international durian market. The durian industry's dominant growth in Asia is driven by consistent, substantial annual demand, which has concentrated durian consumption in Asian markets (Safari et al., 2023). One of the high-value agricultural commodities with large-scale production in Southeast Asia is the durian. The largest importer of durians is China, with an average annual import volume of 740,000 metric tons from 2020 to 2022—accounting for 95 percent of global imports. China generally imports durians from Thailand, and in recent years, its imports have increased from Vietnam, the Philippines, and Malaysia (Food and Agriculture Organization of The United Nations, 2023).

The results of the study indicate that there were changes in the comparative advantages of global durian trade experienced by durian-exporting countries during the observation period. Enhancing the comparative advantage of durian by increasing durian exports. Increasing durian exports requires a focus on improving marketing or export performance. Promotional capabilities, product quality, and distribution, as well as attitudes toward exports as mediating variables, have a significant and positive effect on durian exports (Sittisom et al., 2020). Fresh durians are the preferred choice among Chinese consumers. Durian quality significantly impacts exports; durians that fall below quality standards are disqualified and cannot be exported to China. Another export challenge is pest and disease infestations on durian trees,

which, if left uncontrolled, will cause a decline in the durian supply, thereby indirectly leading to a decrease in export volume (May et al., 2023).

Thailand is a durian-exporting country with a greater comparative advantage than other durian exporters. Research results by Datepumee et al., (2019) in Chanthaburi Province—one of Thailand's major durian-producing regions—show that, on average, farmers can export 82.11% of their durian production. Key factors motivating farmers to produce high-quality durians for both domestic consumption and the global market include the quality of the fruit, orchard management before and after harvest, and high durian prices. Noodaeng (2017) states that Thailand is the world's largest exporter of durian, accounting for 90% of global production. The primary destination for Thai durian exports is China. Land and water transportation are the primary modes of transport for trade between Thailand and China. The free trade agreement between China and Thailand has boosted Thai durian exports to China. Tongmak & Wararatchai (2023) state that efforts to increase the competitiveness of Thailand's durian exports are being carried out by improving durian export performance through enhancing technological innovation, service quality, and flexibility in the management of the durian export supply chain.

The competitiveness of Malaysia's durian exports has declined. Roskan et al., (2025) found that Malaysian durian farmers generally sell larger durians to wholesalers (45%) than to exporters (8.7%), and wholesalers generally sell larger durians to retailers (51%) than to exporters (12.1%). These findings indicate that the durian market value chain in Malaysia is lower for export activities compared to domestic durian marketing. An increase in durian exports by exporting countries experiencing a decline in competitiveness, such as Malaysia, could lead to the development of organic durians. Safari et al., (2023) state that organic durians, which command high prices in local and international markets (including the Chinese market), have the potential to satisfy consumer demand. Exporting countries can increase the competitiveness of durians by developing durian varieties. A study by Zainol et al., (2025) found that the Musang King durian is a variety that is in high demand in the Chinese market and is well known among the local population in Malaysia. The competitiveness of the Musang King durian can be enhanced by increasing both its demand and supply.

The results of this study indicate that the Hong Kong SAR of China is one of the leading durian exporters in the international market, with a comparative advantage that has been steadily declining over the observation period of this study. Jin & Yang (2025) found that durian is a popular single product in China's fruit consumption market. Durian imports will remain the primary means of meeting demand in China's domestic market in the long term, as well as in the world's largest durian consumer market. Durian, as a highly perishable product, has very stringent requirements regarding logistics and transportation conditions within the durian supply chain. Digital technologies such as the internet, the internet of things, and artificial intelligence optimize the resilience and risk management of the durian supply chain.

The research findings in Table 4 show that Vietnam ranks third in terms of comparative advantage, competing with Malaysia. These findings are consistent with those of Likhitpichitchai et al., (2023), who found that Vietnam and Malaysia have higher durian production and exports, making them the two leading competitors to Thailand in durian exports to China. Thanh et al., (2026) state that Vietnam's exports of fresh durian to China increased from 0.19 billion U.S. dollars in 2022 to 3.44 billion U.S. dollars in 2025 as a result of the

bilateral phytosanitary protocol signed in July 2022 and the implementation of the Regional Comprehensive Economic Partnership (RCEP) trade agreement. Non-Tariff Measures (NTMs) determine the competitive advantage in Vietnam's fresh durian trade with China under the phytosanitary regime.

The research findings in Table 6 indicate differences in the sustainability of comparative advantages among durian-exporting countries. The findings of Salsabila et al., (2025) suggest that enhancing the sustainable competitiveness of tropical fruits—including durian—in international markets requires improvements in product quality, export logistics, branding, and diversification of target markets. Chomdej et al., (2026) state that long-term efforts by the Southeast Asian durian industry to enhance the competitiveness of durians in international markets consist of: strengthened supply chain standards supported by good agricultural practices, Geographical Indications (GI), durian genetic profiling, and international certification—all combined with the application of modern molecular breeding tools (marker-assisted selection, genomic selection, and CRISPR/Cas9). Research of Sukloet (2021) found that the competitiveness of the durian industry can be enhanced by establishing a large-scale national e-commerce platform. This initiative can improve access for small durian businesses to domestic and international consumers.

Conclusion

This research shows that global durian trade during the 2002–2025 period experienced significant growth, but still has a highly concentrated market structure. The HHI analysis results show that concentration increased from 4,456 during the period of 2002–2009, to 6,514 in 2018–2025. CR4 and CR8 show the dominance of major exporters approaching 100% of total trade. Thailand is still the largest exporter with the highest comparative advantage while Vietnam is becoming a more competitive exporter. Conversely, Hong Kong SAR and Malaysia experienced a decline in their comparative advantages in the long term. The RCA stability test results show a high degree of persistence, but this is partly due to the dominance of major exporters. The Kaplan–Meier analysis reveals the differences in the sustainability of comparative advantages across countries. Thailand has the highest stability compared with other exporters. In general, these results show that an increase in trade and in the number of exporting countries does not necessarily imply a more even distribution of market share or the maintenance of a uniform comparative advantage.

The result of this research has implications for the development of durian export strategies, particularly in facing a concentrated global trade structure. For exporting countries with existing comparative advantages, it is important to improve supply consistency, product quality, logistics efficiency and market access so that they can maintain their competitive position in the long run. At the same time, countries with relatively low market share and RCA need to focus on increasing production capacity, improving value chains and diversifying destination markets to tap more international trade opportunities. For policy makers, the results of this research emphasize the importance of an export development strategy that is not only oriented towards growing trade value, but also towards strengthening sustainable competitiveness and reducing dependence on concentrated markets. Thus, the integration of indicators of market concentration, comparative advantage, and persistence of competitiveness can become the basis for strategic evaluation in the development of global durian trade.

This study has several limitations that need to be noted. First, the analysis uses the country's aggregate export value so it does not take into account differences in product quality, export prices, trade costs and destination market characteristics that can explain changes in competitiveness. Second, the descriptive approach and stability testing of RCA do not yet allow the identification of factors that causally influence market concentration or the sustainability of comparative advantage. Third, the Kaplan–Meier analysis only covers four major exporters with a limited number of instances of loss of comparative advantage, so the survival results are exploratory and cannot be broadly generalized. In addition, incomplete trade data for some countries, especially Vietnam in 2024–2025, may affect estimates of concentration and competitiveness development at the end of the study period. It is recommended that further research use more complete bilateral trade data, expand the scope of exporters, and integrate analysis of trade duration with production, institutional and market access factors to gain a deeper understanding of the determinants and sustainability of durian's comparative advantage in international trade.

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Conflict of Interest Statement

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Author Contributions

Conceptualization, E.S.S., H.T., and B.S.M.; methodology, E.S.S., H.T., B.S.M., and H.D.B.; formal analysis, E.S.S., H.T., and M.P.; investigation, E.S.S., H.D.B., and M.P.; data curation, E.S.S., B.R., and A.; writing, original draft preparation, E.S.S., H.T., and B.S.M.; writing, review and editing, B.S.M., H.D.B., M.P., B.R., A., and M.Y.; supervision, MP, A, dan MY.; project administration, E.S.S. All authors have read and agreed to the published version of the manuscript.

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