Assessing Indonesian Nutmeg Commodity Trade Competitiveness and Developing Sustainable Strategies in the Global Market

Sujianto Sujianto[1], Ekwasita Rini Pribadi[1], Ratna Ayu Saptati[1], I Gusti Ayu Putu Mahendri[1], Agung Budi Santoso[1], Joula Olvy Maya Sondakh[1], Ronald Timbul Pardamean Hutapea[1], Yulia Pujiharti[1], Zamroni Salim[1], Suci Wulandari[2], Saptana Saptana[2], Saktyanu Kristyantoadi Dermoredjo[3], Budi Rahardjo[4], Hélio Brites da Silva[5]

[1] Research Group of Innovation System and Agricultural Policy, Research Center for Macroeconomics and Finance - National Research and Innovation Agency, Jakarta, Indonesia

[2] Research Center for Cooperative, Corporation, and People's Economy - National Research and Innovation Agency, Jakarta, Indonesia

[3] Research Centre for Economics of Industry, Services, and Trade - National Research and Innovation Agency, Jakarta, Indonesia

[4] TIDAR University, Magelang, Central Java, Indonesia

[5] Dili Insitute of Technology, Ai-Meti Laran, Dili, Timor-Leste

Abstract

Nutmeg encounters challenges in productivity, quality, climate change, Covid-19 disruptions, and stagflation, requiring efforts to enhance competitiveness and meet global market demands. This study aims to analyze Indonesian nutmeg trade performance, assess competitive advantage, and formulate essential strategies to increase its competitiveness. Using comprehensive mixed quantitative and qualitative analysis, methods include export-import market share analysis, CAGR, import dependency ratio, import-to-export ratio, RCA, RSCA, RTA, and SWOT/QSPM analysis. The data obtained from in-depth interviews with key stakeholders was used for formulating strategies enhancing nutmeg's competitiveness. The findings underscore Indonesia's significant dominance in the global nutmeg market, with a considerable 61.6% market share but its export growth rate for nutmeg was less than the import annual growth. The competitiveness indicators demonstrated a robust comparative advantage of Indonesian nutmeg trade in the global market, especially for products categorized as "nutmeg, neither crushed nor ground" and "nutmeg, crushed or ground". Indonesian also has comparative advantage among other exporter countries. Crucial strategies of internal and external perspectives, such as expanding markets, improving nutmeg quality and productivity through improving farmer capacity, technological adoption, and good agricultural practices are necessary to take into account Indonesia's nutmeg competitiveness in global markets.

Keywords

Trade performance, competitiveness, comparative advantage, nutmeg.

Introduction

Nutmeg (*Myristica fragrans* Houtt.) is a tropical fruit obtained from a perennial essential spice tree originating from the Moluccas Islands in the eastern part of the Republic of Indonesia. It has been cultivated in various regions, including the western side of Indonesia and other countries (Sasikumar, 2021). From pre-colonial to modern society, Nutmeg has played a significant economic role throughout history. Since the 1700s, it has become an attracting values power of spice that has pulled traders all over the world to bring the goods recognized as green gold from the Moluccas exported to other continents as profit resources (Pakpahan et al., 2020; Barjiyah and Margana, 2022). The primary economic

utilization of Nutmeg is as one of the spice trade commodities for food, beverage, health medicines, cosmetic, perfume, and toiletries industries. Nutmeg is one of the most popular spices of world-culinary food and beverage flavors and a decent ingredient in such as curry, soup, instant seasonings mix powder, confectionery, bakery products, syrup, and drinks (Ananingsih et al., 2022; Kabak and Dobson, 2017; Farisi and Rasyid, 2022). Peer-reviewed studies and clinical experiments have investigated the potential functions of nutmeg essential oil, revealing its hepatoprotective, antimalarial, anticonvulsant, antiparasitic, nematocidal, and pesticidal activities (Ashokkumar et al., 2022; Vangalapati et al., 2022). Nutmeg offers numerous health benefits in traditional herb treatments, such as in Ayurvedic medicine, including stomachic, carminative, aphrodisiac, and anti-inflammatory properties (Agaus and Agaus, 2019). Nutmeg is also a potential source of functional properties due to its high antioxidant, antiviral, antibacterial, and antifungal activities (Astuty and Sukmawaty, 2022; Adibuduge and Senevirathne, 2023).

In the global market, nutmeg is a prominent species cultivated in developing countries and exported to developed countries to supply industrial consumption, retail, and catering sectors (Gordon, 2020). In 2022, the trade value of global spices was calculated at about 65,377,049 thousand dollars, and the export was dominated by products such as coffee, tea, mate, pepper, vanilla, cinnamon, clove, and nutmeg. The world exported value of nutmeg was estimated at 897,297 thousand dollars or 1.3% of world traded spices with the exporting countries, namely, Indonesia, India, Srilanka, Netherlands, and German (ITC, 2023). Nutmeg was recognized globally in the HS 09 – coffee, tea, mate, and spices category. For more detail within six digits of harmonized system, nutmeg is categorized into four types of products: (1) HS 09081- nutmeg, neither crushed nor ground; (2) HS 090812 - nutmeg, crushed or ground; (3) HS 090821 - mace, neither crushed nor ground; (4) HS 090822 - mace, crushed or ground.

Nutmeg has become a crucial agricultural product for sustainable agriculture, forest, and farmers' welfare. From the domestic socio-economic and biophysical perspective, nutmeg cultivation has been essential to Indonesian farmers and their communities. In 2021, the total nutmeg production was 39,577 tons, produced from 254,699 ha, of which 99.8 % was cultivated by 268.569 smallholder farmers (DG Estates, 2022). It makes Indonesia the biggest nutmeg country producer and exporter. Indonesia holds the first market share globally, with a share of 62% and an export value of around 183,280 thousand dollars in 2021 (ITC, 2022). The ten export country destinations were China, India, Vietnam, Netherlands, Germany, the US, Japan, Pakistan, Bangladesh, and Italy (MoA, 2022). Additionally, tropical agriculture-climatic suitability becomes the primary endowment factor in nutmeg plantations and development in Indonesia (Leatemia et al., 2017). Nutmeg plantations can be developed under the central agroforestry system because they can be cultivated in the rural area and forest edge to gain sustainable farmers' income and preserve carbon stock in the forest (Tjokrodiningrat et al., 2016; Mardiatmoko et al., 2019). However, the Indonesian nutmeg plantation still faces some challenges, such as relatively low productivity, 454 kg/ha, due to the lack of technological adoption, farmers' knowledge related to good agricultural practices and processing technology, which will determine the product quality, capital support, and market information (Muhammad and Neka, 2019). Another critical issue was that the quality of exported nutmeg did not meet international standard requirements, which led to the export rejection by imported countries and got a lower price than Grenada and India (Lawalata, 2019; Hafif, 2021). Moreover, the climate change challenge affects the nutmeg plantation growth, productivity, and quality; finally, it could impact the socio-economic of farmers and society (Anripa et al., 2023). All these factors can determine nutmeg's dynamic competitiveness and comparative advantage in the global market. Purba et al. (2021) have analyzed performance and competitiveness of nutmeg of Indonesia merely in destined export market periode 2014-2018 using RCA and Export Product Dynamic (EPD) based on data export without considering import growth and dependency ratio. According to Pakpahan et al. (2020), there are still ample opportunities for nutmeg development in Indonesia, especially for maintaining global competitiveness, increasing farmers' welfare, and meeting the quality standards demand. Therefore, it is needed a further research for assesing market share, competitive and comparative advantage comprehensively in global market.

On the other hand, the Covid-19 pandemic has impacted to agricultural supply chain economy disruption, exported products, including spices

business chain in terms of lack of traceability, safety and quality concerns, supply chain logistics bottleneck, and require rapid assessment technologies (Peter et al., 2021; Lin and Zhang, 2020). Spices were categorized as intrinsically highly vulnerable rate food disrupted by the supply chain (Ruth, 2020). Therefore, each stakeholder needs new survival strategies, such as improving market regulation, farmers' capacity, and building supply chain resilience (Benedek et al., 2022). Moreover, some worries and predictions about Indonesian conditions face stagnant economic growth and stagflation (Ilyas, 2022). Furthermore, the conflict condition within European fertilizer exported countries might impact increasing agricultural input production. Several developing countries that depend on chemical fertilizer, such as Indonesia, possibly have a negative impact on increasing food prices and agricultural production inputs (FAO, 2022). For those reasons, Government arranged the recovery programs through the development and improvement of agricultural products, especially in efforts to fulfill basic food needs and maintain the competitiveness of agricultural export products. One of the crucial concerns to be addressed is increasing product competitiveness in order to be able to compete in market dynamics and consumer demand, especially in the global market, as well as nutmeg as exported commodity.

Competitiveness is the ability to produce goods and services that meet international consumers' requirements while maintaining high and sustainable levels of income or the ability of product-producing countries to generate high income and employment opportunities while remaining open to external competition. Countries with high competitiveness have technological capabilities to produce innovative finished products (Filo, 2007). Given the circumstances characterized by the consequences of the medical emergency triggered by the COVID-19 virus and the concurrent geopolitical and energy crises, adopting an alternative perspective when considering competitiveness is a necessity (Vîrjan et al., 2023).

Product competitiveness is a multidimensional concept, where a product is expected to meet market conditions and specific consumer needs, including quality, technical aspects, economics, aesthetic characteristics, and its usability (Ozerova et al., 2019). One of the primary methods to enhance the competitiveness of agricultural product trading

in the face of global uncertainties is by broadening our engagement with the international market (Zhou and Tong, 2022). This approach aims to boost agricultural production and trade, effectively addressing the challenges posed by uncertain factors during a global crisis. Competitiveness can also be interpreted as the capacity of producers to face the challenges of international market competition and maintain or increase their export value and market share (Kaleka and Morgan, 2017).

Therefore, nutmeg's comparative and competitive advantage analysis in the global market is crucial for understanding the current position, identifying market competition, and pursuing strategy development. This measurement analysis would be the basis of commodity development in the global market. Therefore, the study focused on nutmeg's net exports and imports, competitiveness, market share, strength, emerging opportunities, weaknesses, and threats.

This study aimed to analyze the current situation of Indonesian nutmeg trade in the global market, measure the competitive and comparative advantage, and analyze the dynamics of strategic commodity competitiveness performance for stakeholders to support increased competitiveness of nutmeg business. These findings and discussions are expected to give beneficial insight and lessons learned among producers and importers countries to the global nutmeg and mace trade and its development.

Materials and methods

The research approach used in this study includes a quantitative analysis and a qualitative descriptive approach. To accomplish the objectives of this research, firstly, the current status and trade performance of Indonesian nutmeg commodities in the global market were calculated using the export-import market share analysis, Compound Average Growth Rate (CAGR), the import dependency ratio, Import to export ratio, Trade Specialization Index (TSI). Second, for analyzing the competitiveness, we also used quantitative methods such as revealed comparative advantage (RCA), revealed symmetric comparative advantage (RSCA), and relative trade advantage (RTA). Third, the qualitative data from in-depth interviews with the representatives of exporters, policymakers, and commodity experts were analyzed using SWOT and QSPM to formulate the essential

strategies to develop the competitiveness resilience of Indonesian nutmeg trade in the global market.

The stages of the study conducted for this research include (1) Identification of the data requirement and resources needed to explore the current status of trade performance and competitiveness; (2) Collection of data of export-import through the ITC- International Trade Center, UN-Comtrade statistics, the Indonesian Statistics Agency (BPS), and data from the Ministry of Agriculture; (3) Calculating the trade performance and competitiveness indicators of nutmeg commodities; (4) Investigation of qualitative data through depth interview related to qualitative data.

The concept theory of revealed comparative export commodity advantage was first initiated by Liesner (1958), but popularized as the Balassa index by Balassa (1965) to measure the country's strengths and weaknesses of export sectors. Some primary econometrical analyses of comparative advantage are the Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), and Relative Trade Advantage (RTA). Researchers have used these tools to analyze the competitiveness of commodities in specific markets. For instance, Rahardjo et al. (2020) analyzed Indonesian coffee competitiveness in the international market, and Ariesha et al. (2019) researched pepper's competitiveness in the ASEAN market. The RCA approach has also been used to analyze the export competitiveness of European countries' agricultural products on the global market. Some EU-15 countries have higher agricultural product competitiveness values and have a longer duration than other EU-12 countries. The Netherlands, France, and Spain are the three most prosperous countries in the export competitiveness of agricultural products (Bojnec and Ferto, 2015). RCA has also been used to analyze the competitiveness of Hungary's strategic agricultural products in the European market with the result that the country has a comparative advantage in animal and meat products compared to other agricultural products (Fertö and Hubbard, 2003). Likewise, in measuring the competitiveness of agricultural commodities in several ASEAN countries in the ASEAN market (Hoang, 2020). The simplification of the RCA formula of competitiveness measurement is Revealed Symmetric Comparative Advantage (RSCA). The RSCA has been carried out for several export agricultural commodities in India (Lakra et al., 2014; Narayan and Bhattacharya, 2019). The RCA and RSCA approaches are often complemented by the relative trade advantage (RTA) method initially introduced by Scott and Vollrath (1992), which has ever been conducted to assess milk competitiveness within European countries (Simo et al., 2016), analyzing the competitiveness of Viet Nam's agricultural competitive advantage in global market (Van Hoang et al., 2017), assessing European agro-food trade competitiveness (Bojnec and Ferto, 2012), and measuring the competitiveness of dried products of Turkey (Erdem, 2020).

This econometric analysis has determined the focus and scope: 1) The calculation of nutmeg exports and imports data was based on HS code 0908-Nutmeg, Mace, and Cardamom and its specific breakdown codes. While the 6-digit HS data specifically for Nutmeg consists of HS090811: nutmeg neither crushed nor ground; HS 090812: nutmeg, crushed or ground, and HS 090821: mace neither crushed nor ground; and HS 090822: mace, crushed or ground. The Nutmeg is a light brown to dark brown from the seed of the nutmeg fruit. At the same time, mace is the cover net of nutmeg seed aril with yellowish to dark red. After drying, the color changes into light yellow, tan, and orange. For technical consideration, the other writing of nutmeg types were only presented in the code of Harmonized System (HS); 2) The calculated data of the research were from 2012 to 2022, which were yearly time series; 3) In calculating RCA, RSCA, and RTA the data cluster of relative comparison based on spices commodities include HS 09: coffee, tea, mate, and spice.

Data analysis

To answer the first problem, we elaborated several analytical tools commonly used to analyze the performance of foreign trade of products, including the Compound Average Growth Rate (CAGR), Trade Specialization Index (TSI), and Import Dependency Ratio (IDR), Those indices were used to analyze the current development, position stages, and dependency indicator of product traded in the global market. Specifically, International Trade Specialization Index (TSI) can describe the relative position of a country that tends to become an exporting or an importing country for an agricultural sector commodity traded on the international market.

Compound Average Growth Rate (CAGR) of nutmeg export or import

$$CAGR = \left(\frac{V_{final}}{V_{begin}}\right)^{1/t} - 1 \qquad (1)$$

$CAGR$ = compound annual growth rate of export or import

V_{begin} = starting value

V_{final} = the end value

t = number of years

Trade Specialization Index (TSI)

$$TSI = \frac{X_i - M_i}{X_i + M_i} \qquad (2)$$

TSI = trade specialization index,

X_i = the value of Indonesia's commodity exports of Nutmeg in the year i,

M_i = the value of Indonesian commodity imports of Nutmeg in the year i

Interpretation of index value, if:

-1 to -0.5: The commodity is categorized as an imported product with very low competitiveness.

-0.4 s/d 0.0: This commodity is categorized as being in the import substitution stage in world trade.

0.1 s/d 0.5: means that the commodity is categorized as being in the starting expansion of exports in world trade.

0.6 to 1.0: means that the commodity is in the category of maturity stage in world trade, so the product has strong competitiveness.

Import dependency ratio (IDR)

This approach explains a country's dependence on imports of certain commodities. The IDR calculation does not include stock changes because the size of imported and domestic production stocks is often unknown. In other words, if a country can meet domestic consumption based on its fulfillment, the IDR will be zero (0%). The IDR value can be calculated using the following formula:

$$IDR = \frac{Nutmeg's\ Import}{(Domestic\ production + Import - Export)} x\ 100 \qquad (3)$$

By understanding the results of CAGR and TSI (the positive value), the type of exported competitive commodity can be described in a 2 x 2 matrix with net trade growth in one axis and TSI in another. The commodities classified as dynamic products are the commodities that have a higher value of growth than the average of world growth and trade specialization index. On the other hand, the positive value of TSI > 0 means that the traded commodity was categorized as export-oriented, while the low value of TSI < 0 means that it is

an imported product for the domestic home market. Domestic static products neither fast-grow nor are specialized. Four different types of commodities competitiveness can be figured as in Figure 1.
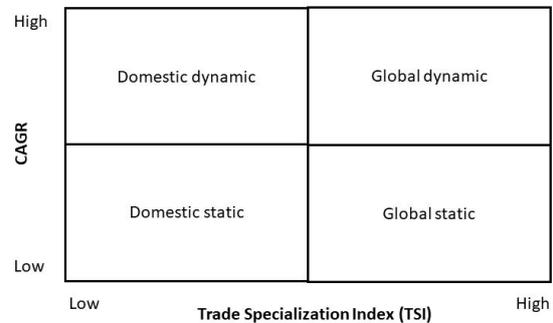
Source: Adapted from Fetscherin et al. (2012)

Figure 1: Type of competitive export commodities.

Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA)

Revealed Comparative Advantage (RCA) or Comparative Advantage Index is one of the essential measurement tools in determining the competitiveness of products produced by a country that is marketed in a particular market. Balassa (1965) stated that the RCA index measures a particular commodity export relative to the total export category and compares them to the other product category performance. This Comparative advantage index helps formulate international trade policies for a product and even some products exported to foreign markets. Furthermore, this RCA index can be used as a guide for each country to determine which sector or commodity choices can generate additional foreign exchange because they have a superiority in competitiveness. Laursen (2015) proposed a refining symmetric index from RCA since the RCA result cannot be compared on both sides. The Revealed Symmetric Comparative Advantage (RSCA) approach was used to rationalize the deficiencies in the RCA index. The concept of RSCA brings a significant simplicity in interpreting the meaning of competitiveness, which is the range of RCSA coefficients. The RCA and RSCA formulas can be adjusted formula as follows:

$$RCA\ Index = \left(\frac{X_{ij}/X_{wj}}{X_{iw}/X_w}\right) \qquad (4)$$

$$RSCA = \frac{(RCA - 1)}{(RCA + 1)}$$

RCA = revealed comparative advantage

$RSCA$ = revealed symmetric comparative advantage

X_{ij} = export value of nutmeg-type commodity from Indonesia

X_{wj} = the total value of the country's spices exports

X_{iw} = export value of nutmeg commodity from the world

X_w = the total value of world spices exports

The commodity is competitive if the RCA indicators value > 0 or RSCA > 0. The commodity has no competitive advantage if the RCA indicators value < 0 or RSCA < 0. If the RCA indicator value = 0, the commodity has neither a competitive advantage nor a disadvantage.

Relative Trade Advantage (RTA)

The RCA and RSCA approaches have the limitation of ignoring the importance of export-import demand and its growth. Therefore, a more in-depth analysis was conducted using the RTA index, calculated based on the difference between the Relative Export Advantage (RXA) and the Relative Import Advantage (RMA). The mapping visualization of index changes is calculated based on the RTA value (Bojnec and Fertő, 2012). Scott and Vollrath (1992) formulated the econometrical analysis of RTA as follow:

$$RTA_{ij} = RTX_{ij} - RMA_{ij} \qquad (5)$$

$$RXA_{ij} = (X_{ij}/X_{it})/(X_{nj}/X_{nt})$$

$$RMA_{ij} = (M_{ij}/M_{it})/(M_{nj}/M_{nt})$$

RTA = Relative Trade Advantage

RXA = Relative Export Advantage

X_{ij} = the nutmeg export "*i*" from country "*j*"

X_{it} = total of the nutmeg export "i" to the global market except for the country "j."

X_{nj} = total of export of spice commodities (HS 09) except the nutmeg into a particular country

X_{nt} = total of all export of spice commodity (HS 09) except nutmeg in the global market except particular country

RMA = Relative Import Advantage

M_{ij} = import of nutmeg "i" from country "*j*"

M_{it} = total of nutmeg import "*i*" from all countries except country "*j*"

M_{nj} = total of all imported spice commodities (HS 09) except the commodity "*i*" from country "*j*."

M_{nt} = total of all imported spice commodities (HS 09) except the commodity "i" from all countries except country "j."

If RTA > 0 and RXA >1, it indicates the commodity has a competitiveness

If RTA <0 and RMA >1, it indicates the commodity has no competitiveness

SWOT dan QSPM analysis

SWOT (Strength, Weakness, Opportunity, and Threat) and QSPM (Quantitative Strategic Planning Matrix) analysis are the analytical framework approach to determine decent strategies (Abdolshah et al., 2017). The advanced strategies in increasing the competitive advantage of strategic nutmeg commodity can be identified by conducting analysis using followed approaches, namely identifying SWOT analysis for each factor, calculating the IFE (Internal Factor Evaluation), EFE (External Factor Evaluation) matric, and conducting the QSPM method (David et al., 2017). SWOT analysis consists of strengths and weaknesses originating from the country's internal competitiveness and opportunities and threats originating from the environment it faces. SWOT analysis is a historical technique to make a qualitative insight into the strategic situation of a commodity's competitiveness (Benzaghta et al., 2021; Gurel, 2017). In contrast, the QSPM is an analytical tool used in decision-making that can assist researchers in evaluating various strategic alternatives objectively, which are based on internal and external factors that have been identified. The QSPM matrix helps evaluate and determine the best strategy most suitable for the internal and external environment. The strategy alternative with the most significant total value obtained in the QSPM matrix can be considered the relevance strategy (Putri et al., 2014).

This analysis is based on in-depth interviews with experts in the particular nutmeg field area, such as champion farmers, local traders, exporters, and government officers, especially the provincial government and the Indonesian Ministry of Agriculture (MoA). The data cleaning process, extracting and processing data analysis, visualization, and interpretation of data were using computer-assisted Qualitative Data Analysis (QDA) software, Nvivo12.

Results and discussion

Indonesian nutmeg trade performance

As a nutmeg exporting country, Indonesia ranks first in the global market share at 61.6% with an export value of around 185,763 thousand dollars from total global export of 301,674 thousand dollars in 2022. For more detail, Figure 2 shows the market share of export and import of nutmeg in global trade. The destinations of Indonesia's exports were China, Vietnam, Japan, German, Italy, the USA, and the Netherlands. In the global market, the nutmeg exporters countries were dominated by Asian countries, such as Indonesia, Sri Lanka, and India. On the contrary, Importers' countries are slightly more evenly distributed all over continents, not only focused on the market in Asian countries but also trading into American, Europe, and Middle East countries. However, some European countries such as the Netherlands and Germany have roles as re-exporter. They were the intermediary countries that imported nutmeg from producing countries for domestic need and resold it to final export destination countries with or without further processing. Netherland nutmeg importing value was about 23,003 thousand dollars, consisting of 20% of nutmeg neither crushed nor ground (HS 090811), 44% of the nutmeg crushed or ground (HS 090812), 10% of mace neither crushed nor ground (HS 090821), and 26% of mace crushed or ground (HS 090822). Those kinds of nutmeg were used for its domestic consumption and re-export to the global market. The re-exporting value of the Netherlands was about 13,836 thousand

dollars, more than half of its export value. Likewise, Germany imported Nutmeg mainly from Indonesia, Grenada, Sri Lanka, and India. About 79 % of imported value was used for domestic needs, and 21 % was traded to be re-exported to neighboring European countries.

As the leading exporter of nutmeg in the global market, Indonesia still became an importer country. The Indonesian export value of nutmeg continues to increase significantly with a Compound Average Growth Rate (CAGR) for 2012-2022 of 3.27%, but it also accompanied import incline over the past few years with a growth CAGR of 27.85% (Table 1). CAGR export means the annual growth rate based on the geometric progression ratio over 2012-2022. The Indonesian annual export growth of nutmeg was less than the average world export growth, 11.8% annually.

Unprocessed nutmeg dominates the exports in the form of dried whole nutmeg seed and mace (fuli). Most imported-nutmeg was in terms of processed and derivated products such as nutmeg powder from other countries. However, the trade analysis of Indonesian nutmeg shows that nutmeg is an essential exported commodity, indicating that 70.8% of domestic production was exported to other countries. This trade is confirmed by the value of the import dependency ratio in 2021, and 2022 were only 1.06 and 3.92 %, respectively. The ratio of imports to imports is still relatively low, with only 1.66% of the total exports of Nutmeg in 2022. This percentage shows the ability to meet domestic consumption.
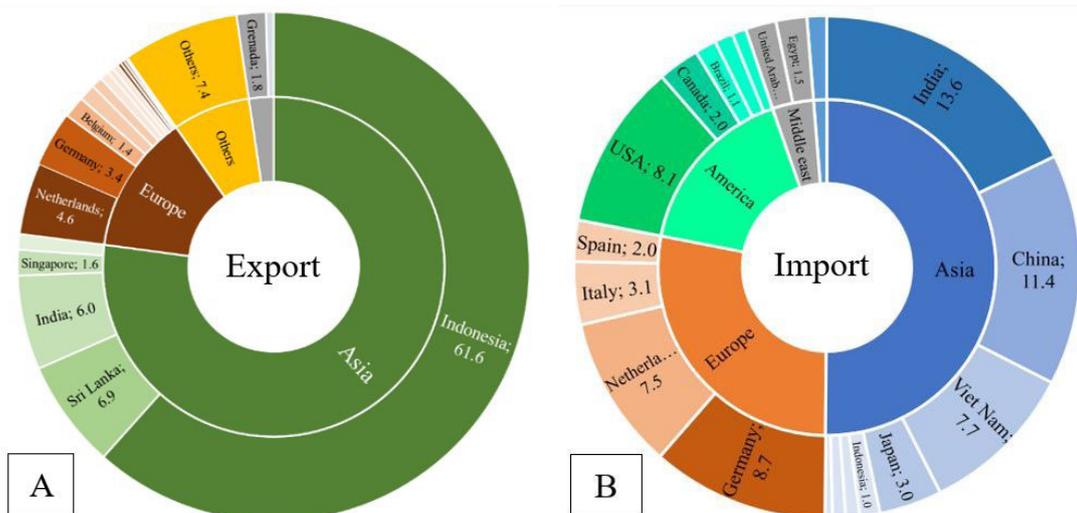
Source: Own calculation based on ITC-statistic and UN-Comtrade, 2023

Figure 2: Market share percentage of nutmeg exporters countries (A) and importers countries (B) on the global market 2022.

The import dependency ratio (IDR) also declares the value of imports compared to total production plus the difference between exports and imports. The TSI (Trade Specialization Index) was conducted to validate as an export commodity. The TSI value of Indonesian nutmeg from 2011 to 2021 is 0.96-0.99 (Table 1). These values show that the commodity is categorized as an exported product in the maturity stage.

Based on the growth and TSI value, Indonesian nutmeg was categorized as a global static competitiveness commodity in the global market. The value of the trade specialization index (0.9) was high, but the CAGR value (3.27%) was less than the average annual world growth (11.8%). It means that the nutmeg market focuses on global trade and market specialization. However, from 2012-2022, the spices commodities had an average annual growth rate of 13.46%. The relative growth of the Nutmeg to spices market was classified in the dynamic trade. Nutmeg's global static matrix zone indicated that the export growth was lower than other spices commodities. It is the chance to compete or expand the market share based on the growth rate.

On the other hand, the growth rate of imports should be a concern for the government to control it. Both the rate of import and export can be seen in Table 1. It can be initiated by transforming raw nutmeg into semi-processed or processed products, adding more added value to substitute imports. In the future, it is hoped that Indonesia, as a nutmeg-producing and exporting country, will not rely on the export of nutmeg of neither crushed nor ground but instead on their derivates products which have a higher value.

Indonesia's exports of nutmeg are dominated by Indonesia's neither crush nor ground nutmeg exports (HS 090811) then, followed by 090821 (mace, neither crushed nor ground), HS 090812 (Nutmeg, crushed or ground), and HS 090822 (mace, crushed or ground), as can be seen in Figure 3. In one decade, the total export value of nutmeg had increased from about 140 million dollars to more than 180 million dollars. Even though they had decreased export value from 2012 to 2016, the export trend rose again until 2021. Since 2017, the export value of mace HS090821 has overtaken the export value of nutmeg HS090812. The significant increase in the export of all kinds of nutmegs in 2020-2021 was driven by the high market demand due to covid-19 pandemic health awareness. After that time, the exported nutmeg declined. This condition was related to covid-19 relaxation, which determined the market demand, and the global economy was stagflation. In contrast, the export of HS 090812 nutmeg, crushed or ground, increased from 22.4 million dollars to 33.3 million dollars. It indicated the initiation of exported processed products. Likewise, the export of HS 090821 mace was neither crushed nor ground, which was double the export value in one decade. In nutmeg agribusiness, farmers and exporters begin sorting mace as an exported valuable commodity and do not prefer to sell it as crushed or ground.

Year	Production Quantity (ton)	Production (US Dollar thousand)	Import Values (US Dollar thousand)	IDR (%)	Export Values (US Dollar thousand)	RIE (%)	TSI index
2012	25,321	189,290	815	1.63	140,018	0.58	0.99
2013	28,167	184,774	1,736	2.71	122,372	1.42	0.97
2014	32,729	178,210	626	0.94	112,248	0.56	0.99
2015	33,711	156,319	948	1.66	100,141	0.95	0.98
2016	33,305	161,330	1,091	1.52	90,469	1.21	0.98
2017	32,842	145,818	930	2.49	109,353	0.85	0.98
2018	44,100	201,549	2,237	2.43	111,698	2.00	0.96
2019	40,689	252,679	2,051	1.76	138,024	1.49	0.97
2020	38,150	293,729	1,388	1.02	158,520	0.88	0.98
2021	39,577	294,304	1,031	1.06	198,114	0.52	0.99
2022	39,955*	261,306*	3,085	3.92	185,763	1.66	0.97
CAGR Export				3.27			
CAGR Import				27.85			

Note: * estimation value calculated by Indonesian Ministry of Agriculture (MoA).
Source: own calculation based on MoA, BPS-Statistic Indonesia, and dan UN Comtrade (2023)

Table 1: Indonesian nutmeg production, export-import, IDR (Import Dependency Ratio), RIE (Ratio Import to Export), and Trade Specialization Index (TSI).
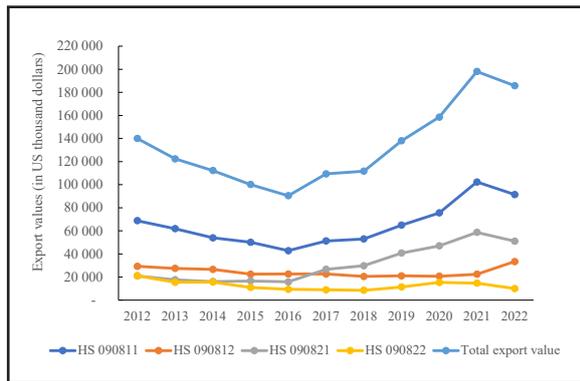
Source: Own calculation based on ITC-statistic and UN-Comtrade, 2023

Figure 3: Export value of four kinds of nutmegs HS 090811 (nutmeg, neither crushed nor ground), HS 090812 (nutmeg, crushed or ground), HS 090821 (mace, neither crushed nor ground), and HS 090822 (mace, crushed or ground).

Comparative and competitive advantage

The RCA and RSCA indices are measuring tools for determining the competitiveness of a country's commodities relative to category commodities marketed in specific market areas. High RCA and RSCA values indicate not merely a commodity's competitiveness and market share but also the competitiveness of nutmeg commodities against similar commodities in a country. The results of the calculation of the RCA of the nutmeg trade were transformed and presented into RSCA values. Among the exporter countries, Indonesia has the highest value of the RSCA index, with the RSCA index 2022 and average values of 0.91 and 0.86, respectively, as shown in Table 2. RCA indicators value > 0 or RSCA > 0 means nutmeg commodities have a competitive advantage. It can be said that Indonesian Nutmeg was a more competitive advantage and specialized commodity than other spice commodities in the category of HS 09 coffee, tea, maté, and spices in the global market. Even though the change index value did not increase (0.0%) in ten years and was relatively stagnant. Of the ten top exporter countries, only five exporters have a positive value of RSCA, namely Indonesia, the Netherlands, Sri Lanka, India, and Germany in 2022. Interestingly, Netherlands and Germany are not nutmeg producer countries, but they have a competitive advantage in nutmeg trade relative to their spice commodities in the global market.

All nutmeg products have a positive competitive advantage in the global spices market, as presented in Table 3. All types of Nutmeg were essential and specialized for Indonesian export. Even though the export values were still focused on HS 090811 and HS 090821, the mean values of RSCA in one decade were almost the same. From Change Index (2023/2012), the increased competitiveness advantage of the product HS 090811 and 090812 were 6.67 %and 7.97 %, respectively. Conversely, Change Indices were relatively constant on HS090821 and HS 090822 products. They were

No	Exporters	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Mean	CI (%)
1	Indonesia	0.86	0.82	0.84	0.81	0.82	0.85	0.88	0.89	0.89	0.90	0.91	0.86	0.00
2	Netherlands	0.76	0.70	0.60	0.65	0.65	0.59	0.49	0.46	0.38	0.37	0.47	0.56	-0.26
3	Sri Lanka	0.36	0.46	0.52	0.44	0.45	0.49	0.54	0.62	0.52	0.45	0.42	0.48	0.33
4	India	0.58	0.50	0.56	0.61	0.68	0.57	0.51	0.35	0.45	0.46	0.31	0.51	-0.12
5	Germany	0.19	0.28	0.30	0.26	0.34	0.24	0.25	0.05	0.02	0.11	0.19	0.20	0.05
6	France	0.27	0.29	0.35	0.18	0.29	0.12	0.16	0.02	-0.13	-0.23	-0.32	0.09	-0.67
7	Grenada	0.00	0.11	0.19	0.19	0.21	0.07	0.13	0.08	0.00	-0.13	-0.12	0.07	∞
8	Italy	0.34	0.14	0.16	-0.14	-0.11	-0.13	-0.16	-0.24	-0.23	-0.18	-0.17	-0.07	-1.21
9	USA	-0.19	-0.18	-0.22	-0.12	-0.23	-0.20	-0.26	-0.35	-0.34	-0.36	-0.34	-0.25	0.32
10	Belgium	0.05	-0.16	-0.17	-0.25	-0.24	-0.41	-0.52	-0.44	-0.41	-0.31	-0.22	-0.28	-6.60

Source: Own calculation based on export-import nutmeg global trade, UN-Comtrade, and ITC statistics

Table 2: RSCA, mean value, and Change Index of all kinds Nutmeg of ten exporting countries in 2012-2022.

Type of nutmeg	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Mean	CI (%)
HS 090811	0.87	0.82	0.84	0.82	0.82	0.85	0.89	0.90	0.90	0.92	0.93	0.87	6.67
HS 090812	0.79	0.75	0.79	0.73	0.78	0.78	0.81	0.81	0.78	0.79	0.85	0.79	7.97
HS 090821	0.87	0.87	0.89	0.85	0.86	0.87	0.89	0.87	0.88	0.88	0.87	0.87	0.06
HS 090822	0.87	0.87	0.89	0.85	0.86	0.87	0.89	0.87	0.88	0.88	0.87	0.87	0.06

Source: Own calculation based on export-import nutmeg global trade, UN-Comtrade, and ITC statistics

Table 2: RSCA, mean value, and Change Index of all kinds Nutmeg of ten exporting countries in 2012-2022.

according to their export values of mace that were less than the export value of Nutmeg (HS 090811). Exporters in Indonesia can expand HS 090821 and HS 090822 to compete in the existing market or find new prospectus-importing countries.

Relative Trade Advantage (RTA)

The RTA, RXA, RMA, and CI analysis show that Grenada, Indonesia, and Sri Lanka were the only exporting countries with RTA> 1, RXA>1, and CI positive values. It can be said they have a competitive advantage relative to their spices export in the global market. Those values can be seen in Table 4. Grenada owned the highest values. The Relative Trade Advantage (RTA) trend was also significant, reaching 939.15% from 2012-2022. Its value exceeded Indonesia's RTA Change Index (102%) and Sri Lanka's (41.08%). Grenada is a progressive newcomer exporting country, now holding a 1.8% world export market share in 2022.

This value is much smaller than Indonesia's market share (61.6%) and Sri Lanka's (6.9%). However, the rapid growth of Grenada's production and export can open up the possibility that Grenada could overtake Sri Lanka and India in the next ten years. On the other hand, the exporters' countries that were not producer countries, such as Netherlands, France, and USA, even though they have positive RTA values, the trend value was negative. It means they have a declining trend competitive disadvantage of nutmeg in the global spices market.

All types of Indonesian nutmeg products are categorized with competitive advantage indicated by their RTA value > 0 and RXA>RMA value. It can be seen in Table 5. In the breakdown value of nutmeg commodities, the nutmeg products HS 090811, nutmeg neither crushed nor ground, has the highest value of RTA average, but it has

Country	Indicators	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Mean	CI (%)
Indonesia	RXA	29.48	17.73	21.29	16.15	17.69	22.92	33.63	38.22	39.70	49.13	60.26	31.47	104.41
	RMA	0.42	2.08	0.61	1.23	0.79	0.65	0.99	1.34	1.06	0.63	1.42	1.02	238.10
	RTA	29.07	15.66	20.69	14.92	16.91	22.27	32.64	36.88	38.65	48.49	58.84	30.46	102.41
Sri Lanka	RXA	1.85	1.86	2.02	1.92	2.00	1.74	2.24	2.77	2.02	1.81	2.61	2.08	41.08
	RMA	0	0.43	0.37	0	0.07	0.08	0	0	0.25	0	0	0.20	20.00
	RTA	1.85	1.42	1.66	1.92	1.93	1.65	2.24	2.76	1.77	1.81	2.61	1.97	41.08
India	RXA	2.37	2.10	2.59	2.58	3.06	2.25	1.74	1.02	1.19	1.26	1.01	1.92	-57.38
	RMA	0	4.69	4.35	3.65	2.76	4.93	6.76	10.43	6.86	10.43	27.78	8.26	27.77
	RTA	2.37	-2.59	-1.76	-1.07	0.30	-2.68	-5.02	-9.41	-5.67	-9.18	-26.77	-5.59	-1229.54
Netherlands	RXA	8.54	6.66	4.32	5.21	5.31	4.23	3.15	2.86	2.35	2.26	2.91	4.35	-65.93
	RMA	5.75	4.97	3.11	3.34	2.67	2.28	1.76	2.10	2.01	2.20	2.53	2.97	-56.00
	RTA	2.79	1.70	1.21	1.87	2.64	1.95	1.39	0.76	0.35	0.06	0.38	1.37	-86.38
Germany	RXA	0.57	0.54	0.53	0.54	0.60	0.53	0.56	0.46	0.53	0.48	0.55	0.54	-3.51
	RMA	1.35	1.52	1.02	0.81	0.78	0.78	0.81	0.93	0.95	0.94	0.91	0.98	-32.59
	RTA	-0.78	-0.99	-0.49	-0.27	-0.18	-0.25	-0.25	-0.47	-0.42	-0.46	-0.36	-0.45	-53.85
Italy	RXA	1.98	1.07	1.06	0.62	0.60	0.53	0.46	0.36	0.35	0.34	0.39	0.71	-80.30
	RMA	1.29	1.23	1.07	0.69	0.60	0.65	0.48	0.53	0.64	0.75	0.72	0.79	-44.19
	RTA	0.68	-0.16	-0.01	-0.07	0.00	-0.12	-0.02	-0.17	-0.28	-0.40	-0.33	-0.08	-148.53
France	RXA	2.44	1.10	1.03	0.81	0.76	0.48	0.46	0.29	0.25	0.22	0.33	0.74	-86.48
	RMA	0.78	0.59	0.53	0.51	0.42	0.36	0.28	0.31	0.34	0.41	0.53	0.46	-32.05
	RTA	1.65	0.51	0.50	0.30	0.34	0.12	0.18	-0.02	-0.09	-0.19	-0.20	0.28	-112.12
Grenada	RXA	20.87	21.00	195.00	207.00	219.00	222.00	225.00	196.00	183.00	168.00	217.00	170.35	939.77
	RMA	0	0	0.43	0	0	0	0	0.33	0	0	0	0.38	0
	RTA	20.87	21.15	194.83	207.26	218.61	221.86	225.48	195.57	183.48	168.20	216.87	170.38	939.15
USA	RXA	0.60	0.47	0.45	0.46	0.44	0.48	0.40	0.33	0.40	0.41	0.46	0.45	-23.33
	RMA	0.66	0.52	0.45	0.42	0.37	0.32	0.31	0.32	0.39	0.48	0.41	0.42	-37.88
	RTA	-0.07	-0.05	-0.01	0.04	0.07	0.16	0.09	0.01	0.01	-0.07	0.05	0.02	-171.43
Belgium	RXA	0.48	0.56	0.63	0.46	0.53	0.51	0.46	0.60	0.69	0.72	0.56	0.56	16.67
	RMA	1.34	1.02	1.12	0.81	0.90	0.87	0.76	0.79	1.00	1.17	0.76	0.96	-43.28
	RTA	-0.85	-0.46	-0.49	-0.35	-0.36	-0.36	-0.29	-0.19	-0.31	-0.45	-0.20	-0.39	-76.47

Source: Own calculation based on export-import nutmeg global trade, UN-Comtrade, and ITC statistics

Table 4: RXA, RMA, RTA values, Means, and Change Index (CI) of all nutmeg of top ten exporting countries in the global market.

Type of nutmeg commodities	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Mean	CI (%)
HS 090811													
RXA	13.98	8.68	9.91	7.90	8.16	10.41	15.31	17.13	17.97	23.87	28.09	14.67	100.9
RMA	0.29	1.66	0.54	1.08	0.49	0.34	0.12	0.85	0.49	0.40	0.66	0.63	127.6
RTA	13.69	7.02	9.37	6.82	7.67	10.07	15.19	16.28	17.48	23.47	27.43	14.04	100.4
HS 090812													
RXA	5.74	3.73	4.74	3.46	4.20	4.48	5.72	5.32	4.69	4.91	9.74	5.16	69.7
RMA	0.12	0.45	0.17	0.19	0.67	0.58	1.35	0.65	0.60	0.13	0.59	0.50	391.7
RTA	5.62	3.28	4.57	3.26	3.54	3.90	4.37	4.67	4.09	4.78	9.16	4.66	63.0
HS 090821													
RXA	4.11	2.39	2.85	2.55	2.94	5.27	8.32	10.32	10.69	12.87	14.91	7.02	262.8
RMA	0.00	0.04	0.01	0.38	0.00	0.00	0.00	0.18	0.02	0.00	0.06	0.06	6.0
RTA	4.11	2.35	2.84	2.17	2.94	5.27	8.32	10.14	10.67	12.87	14.85	6.96	261.2
HS 090822													
RXA	4.13	2.10	2.78	1.69	1.73	1.76	2.37	2.88	3.48	3.22	2.92	2.64	-29.3
RMA	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03	0.01	0.02	0.01	1.0
RTA	4.13	2.10	2.78	1.69	1.70	1.76	2.37	2.88	3.45	3.21	2.90	2.63	-29.8

Source: Own calculation based on export-import nutmeg global trade, UN-Comtrade, and ITC statistics

Table 5: RXA, RMA, RTA, mean values, and Change Index (CI) of all kinds of Nutmeg of Indonesian trade in the global market.

a change index lower than the type of product HS 090821, mace neither crushed nor ground. The highest value of CI was at HS 090821, mace neither crushed nor ground, reaching 261.1%. The trend RTA value of all nutmeg is increasing, except RTA's HS 090822, which has decreased by about 29.3%. The product HS 090822 was still exported without further processing, and only a small amount was exported in powder. The RMA values in each commodity type are relatively low and less than each RXA value. Despite the relatively low value, the RMA value of each product tends to incline year by year. This is what needs to be considered to maintain its level of competitiveness in the future.

SWOT and QSPM analysis

Some essential findings from the depth interview with the primary actors in the nutmeg sectors reveal that the Indonesian nutmeg trade has strengths, weaknesses, opportunities, and threats, as presented in Table 6. It has strengths from internal factors, such as agro-climatic endowment factors, availability of cultivation technologies, workforce, and genetic nutmeg biodiversity. While the weaknesses are that nutmeg takes a long time to start fruiting, has low farmers' knowledge, is small-scale farming, and needs input support. On the other hand, there are some opportunities as the external factors such as the emerging market of derivative products,

growth of importing countries, and increasing demand for spices in the global market. However, it faces some challenges threats, namely increasing competitors' production, climate change, high quality of market demand, and global market security. In the internal factor based on IFE analysis (Table 7), the essential two findings should be accentuated that Indonesian nutmeg has some innovations in the nursery supported by the Ministry of Agriculture in nutmeg centers, seed grafting technology, superior varieties, and the downstream research support; and comparative advantage in terms of agro-climatic endowment. In the EFE analysis, two key factors should rely on market growth opportunity and the awareness of other producing competitors. This is consistent with Anggrasari and Saputro (2022), that Indonesia is the fourth-largest exporter of spices in the world. Indonesia continues to be the leader in terms of area and productivity, especially for cinnamon, cloves, and nutmeg.

INTERNAL FACTORS / EXSTERNAL FACTORS	*Strengths*	*Weakness*
	S1: Agro-climate suitability and ease of cultivation as forest plants and non-timber conservation	W1: The annual plant that takes 3-5 years to start bearing fruit
	S2: Availability of innovations in nursery cultivation, grafting technology, superior varieties, downstream research support	W2: The level of knowledge of farmers related to cultivation, harvesting, and post-harvest technology is relatively low
	S3: The number of demographic bonus workers in the labor sector	W3: Small farming businesses, not yet centralized, and low productivity
	S4: The genetic resources and commodities of Indonesia's nutmeg are well-known to the world	W4: Less input support, Nutmeg does not get subsidized fertilizer
Opportunities	"SO Strategies"	"WO Strategies"
O1: Market growth of nutmeg, spices, and derivative products that open the development of value-added products such as essential oils and cosmetic raw materials from nutmeg	SO1: Preparing domestic production in order to take a positive growth of the nutmeg market by Increasing national production through rejuvenating unproductive nutmeg and preparing seeds using grafting technology	WO1: Accelerate fruit production with grafting technology to increase national production and meet market share growth opportunities
O2: New markets of importing countries	SO2: Efficiency of supply chain lines and costs to destination countries and direct harbor port in east Indonesia	WO2: Increasing farmer knowledge through training, technical guidance, and assistance to increase production and productivity, quality, and create value-added products
O3: Efficiency of supply chain lines and costs to destination countries based on technological developments	SO3: Developing value-added derivative products and scaling up new nutmeg-based businesses, such as essential oil and cosmetic raw materials from nutmeg	WO3: Strengthen farmers' community base for creating more added-value products
O4: Positive growth trend CAGR of 6.5% from 2020 to 2027 for the world spice market	SO 4: Growing new agri-preneurs or exporters to create new markets, especially export destination countries	WO4: The need for fertilizer subsidies or the manufacture of nutmeg fertilizer which is cheaper to reduce production costs, and the need for ports in development centers for cost efficiency
Threats	"ST Strategies"	"WT Strategies"
T1: Competitors for nutmeg producers from other countries, such as Grenada, India, and Sri Lanka, are increasing their market share	ST1: Trying to increase the market share by growing a new exporter and new importing countries	WT1: Encouraging farmers to adopt SOP and GAP to increase the production quality of products
T2: Challenges of climate change on production and productivity	ST2: Anticipate the use of technologies through climate change mitigation and adaptation strategies	WT2: Maintain the quality of nutmeg and keep the market from switching to competitors
T3: EU green product regulations related to free aflatoxin and deforestation	ST3: Try to comply with the green nutmeg quality and standard by adopting technologies in farmers and processors	WT3: Improving farmers' knowledge about mitigation and adapting strategy to climate change
T4: Global market security and stagflation conditions	ST4: Developing a sustainable nutmeg plantation program that is economically, socially, and environmentally feasible	WT4: Paying attention not to destroying the forest and being environmentally friendly

Source: Own authors' analysis considering the experts' opinion

Table 6: SWOT analysis matrix of Indonesian nutmeg competitiveness

No	Internal Key Factors	Weight	Modus Rating	Score	External Key Factor	Weight	Modus Rating	Score
	Strengths	Ai	Bi = 1,2,3,4,5	AixBi	*Opportunities*	Ci	Di = 1,2,3,4,5	C1xD1
1	S1	0.14	4	0.56	O1	0.2	4	0.8
2	S2	0.16	5	0.8	O2	0.13	3	0.39
3	S3	0.12	3	0.36	O3	0.09	4	0.36
4	S4	0.1	3	0.3	O4	0.11	3	0.33
		0.52		2.02		0.53		1.88
	Weakness				*Threats*			
1	W1	0.15	4	0.6	T1	0.17	3	0.51
2	W2	0.16	3	0.48	T2	0.12	3	0.36
3	W3	0.1	3	0.3	T3	0.1	3	0.3
4	W4	0.07	2	0.14	T4	0.08	3	0.24
		0.48		1.52		0.47		1.41
	Total	1		3.54		1		3.29

Source: Own authors' calculation based on the experts' view

Table 7: Internal Factor Evaluation (IFE), and External Factor Evaluation (EFE) matrix.
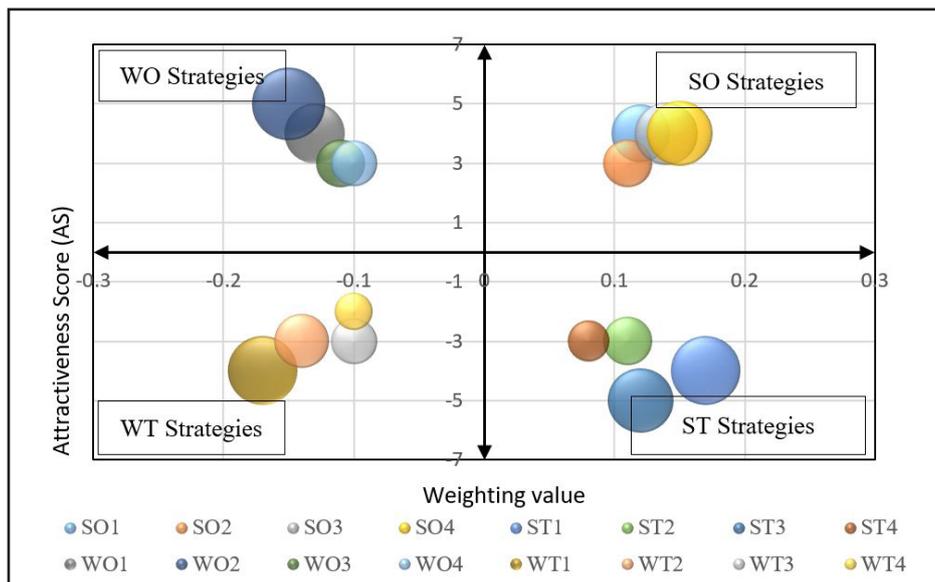
Source: Own authors' graphical creation

Figure 4: Focus strategies nutmeg competitiveness based on the QSPM analysis graph of key factors strategies.

The QSPM results prioritize strategies to improve nutmeg competitiveness in the global market in four quadrants, SO, WO, ST, and WT (Figure 4 above). For the SO strategies, trade should focus on expanding the market to other importing countries, and the ST strategies address producing good quality nutmeg as international standard demand. For WO strategies, it needs to increase farmers' knowledge to increase production and productivity and create value-added products.

The WT strategies prioritize encouraging farmers to adopt SOP and GAP of Nutmeg, which finally increase domestic production and quality of nutmeg products. Overall, to increase nutmeg competitiveness in the global market, Indonesia should give attention to market expansion to importing countries, either new or existing countries, and focus on producing good quality and high productivity through increasing farmers' knowledge in adopting good agricultural practices.

Conclusion

The current trade situation of Indonesian nutmeg reveals still a robust performance, with Indonesia maintaining a strong role in the global market. Majority nutmeg was exported globally. Despite its leading position as the primary exporter of nutmeg, Indonesian nutmeg still face the significant challenges include the low of growth rate of exports (3.27%), exported unprocessed and imported derivative product, and high nutmeg imports growth (27.85%). The Trade Specialization Index categorized this commodity as a gobal static competitiveness commodity of exported product in the maturity stage that need to focus on market specialization, which can be developed through maintaining and increasing quality standard, and the innovation strategy to process nutmeg into added value product which can replace import demand dan initate sell it to global market.

From the competitiveness indicators of nutmeg trade, it can be concluded that Indonesian nutmeg has been more competitive advantage and specialized commodity than other spice commodities in the category of HS 09 coffee, tea, maté, and spices in the global market, especially still focused on the type of nutmeg HS 090811 and HS 090812. It is a big chance to increase the export rate in HS 090821 and HS 090822 both current or new market. Comparatively, Indonesia has been the highest positif value of RSCA (mean = 0.86 and CI = 0%) among ten top exporter countries. It show obviously that Indonesian as a nutmeg producer still hold comparative advantage by holding the higher market share of nutmeg export than the others. However, Grenada has been a newcomer allert in global market initiating to export nutmeg focus within decade with relative advantage (RTA value) higher than Indonesia. Fortunately, it only has market share 1.8%, much less than Indonesian market share 61.6%. Meanwhile, based on type of nutmeg, all RTA values are more significant than

zero, indicating they have a competitive advantage relative to spice in the global market. Likewise, their trend, all CI tend to increase except the type of nutmeg HS 090822 mace, crushed or ground that has negative change.

Some crucial strategies (external and internal) were proposed for increasing nutmeg competitiveness in the global market. On the external side, Indonesian's trade should give attention to market expansion and export growth for running a static to dynamic global market both targeting new importing countries and existing countries. In internal factors, farmers should concentrate on producing good quality and high productivity nutmeg by increasing farmers' capacity and knowledge, adopting technologies, and practicing good agricultural practices. In addition, Indonesia's government and all domestic actors must make extra efforts to maintain and increase Nutmeg's competitiveness both from internal and external aspects.

The limitation of study was the research only focus in macro and global perspetive based on the analyzed data. This research could not able to explore detail about the comparative advantage and competitive of each country producer in term of cost of production of nutmeg, transcation cost and value chain in each country. Meanwhile, for enhancing Indonesian nutmeg competitiveness, further research about supply and value chain analysis from farm to export market in multi-layer actors could be proposed, so it could be benefit for the stakeholders taking a comprehensive decision.

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Corresponding author:
Sujianto, S. T P., M.ABM, Senior Researcher
Research Group of Innovation System and Agricultural Policy
Research Center for Macroeconomics and Finance - National Research and Innovation Agency
Gatot Subroto Street No. 10, Jakarta City 12710, Indonesia
Email: sujianto@brin.go.id; suj14nt0@gmail.com

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