

ISSUES AND CHALLENGES OF EXPORTING MALAYSIA MUSANG KING DURIAN TO CHINA

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ABSTRACT

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This project paper is to analyse and understand Musang King Durian (MSKD) for its fruit, plantation and market, especially export to China Market. To make comparison to Thailand durian Monthong. To use research finding to recommend to answer to all challenges. Porter Five Force model and SCCMT to give in-depth figure to support the proposals.

Projection of China durian market size on 2030, to find out that Malaysia MSKD is able to achieve 10% of China market share. This achievement is significant for the MSKD plantation in Malaysia. To find out the challenges faced by the MSKD plantation and analyse the main issue and proposal. Study of Malaysia MSKD export to China and key factor for approval.

To understand supplies chain logistic model currently practice and propose proposal.

1. Introduction

1.1 Background

Agriculture is crucial for economic growth. In 2014, it accounted for 33% of global gross domestic product (GDP). Agriculture is vital to Malaysia's economy, contributing 7%-12% to the nation's GDP and 16% of the workforce employment. Large-scale plantations were introduced for cash crops — rubber in 1876, palm oil in 1917 and cocoa beans in 1950, as well as bananas, coconuts, durians, pineapples, rice and rambutans. (Raju Chellam / The Edge Malaysia, 2020).

Durian has always been most Asian's favourite fruit, hence becoming popular with its potential in export and value. Similarly, to wine, although it is an acquired taste, one usually falls in love with this nutritious fruit after the first try. Musang King Durian (MSKD) was highly in demand in China right after the China premier tasted it when visiting Malaysia, coupled with the Nitrogen Quick Freezing Process (NQFP) which enable Malaysia MSK durian to export to China.

“Covered with peculiar thorns and inside the fruit is extremely smooth and creamy, durians, the longest-running “King of Fruits” in South East Asia were cultivated 1,300 years ago near Yogyakarta, Indonesia. This fruit is believed to be originated from Borneo, Sumatra, and Peninsular Malaysia centuries ago. In the present day, durian is heavily farmed in Malaysia, Indonesia, Thailand, and even the Philippines.

Well known for its pungent aroma, creamy texture, and bittersweet aftertaste that ranges widely depending on the durian type, durians are highly sought-after not only by durian lovers in the South East Asia region, but all around the world including China, the United States, and Japan. China alone imports more than US\$3 billion worth of durians in the year 2020. This number is set to increase by 220% at the end of 2025. In the US, durian is sold at a ceiling price of US\$13 per pound and this figure is bound to

increase as the demand continues to grow exponentially.” (B-101, 2022) There are more than 200 durian types and clones registered under the Ministry of Agriculture and Food Industries Malaysia. There are still many types of durian species unregistered.

1.1.1 Durian plantation in Malaysia.

Traditionally, durian is planted by small orchard, averagely land use is 1-3 hectares. Most of the farmer didn't take durian as their main source of income as durian is seasonal unlike rubber or palm oil which can harvest all year round. Additional to that, durian harvest is very much affected by weather and seasons. Previously, if the harvest is big in that season, then the price will drop, because once the durians are ripened and dropped from the tree, the fruit fermentation will start and the good condition of the durian will last for 3 days only. Therefore, durian hardly can export as the shelf life is too short. Thus, the durian price is cheap while that season harvest is big and expensive when season is low in harvest. Usually, the first season of the year are May to September and the second season is from December to January.

Durian cultivation in Malaysia, once small-scale, gained prominence due to declining prices of commercial crops like oil palm, rubber, and cocoa. Driven by the rising value of Musang King Durian (MSKD), it constitutes 41% of cultivated land, reaching 70,000 hectares. Considered a lucrative commodity, MSKD's price surged, and Malaysia's overall durian export volume to China increased by 143% from 2012 to 2017. In 2019, China allowed frozen durian imports. Farmers and corporations, including Singaporean and Chinese investors, capitalized on this, expanding plantations to meet the growing Chinese demand. Despite a temporary dip in production, durian's strategic shift ensures sustained market growth. Durian grafting facilitates the transition from traditional varieties like D24 to MSKD.

1.1.2 MSKD compared to another durian in Malaysia

MSKD is a type of durian that is highly regarded for its rich, creamy, and bittersweet taste, as well as its distinct aroma. It is often considered superior due to several reasons like aroma, taste, nutritional value and high demand & rarity.

MSKD price reaching RM100.00 per kg in July 2017 and the cultivation has increased many folds, become the most popular crop and making up to 41% of the land cultivated (70,000 hectares). MSKD is considered as a gold commodity and a new source of income for Malaysia. (Dr Abdul Aziz Zakaria, 2020)

MSKD is different from other because MSK meet the requirement for the demand for frozen and fresh MSK from China. MSK export volume increased by 143% in 5 years (2012 and 2017). Price increased by 530%. In May 2019, Malaysia MSKD obtained permission to export frozen to Chinese. Global supply in 2016, Thailand dominated 95% (402 million kg) followed by Malaysia 4%. Import country, China dominated 66% (292 million kg), followed by Vietnam, Singapore and Hong Kong. The durian global demand in 2016 is USD 9891.81 million between 2022 and 2027 (Technavio, 2023) Expected more than USD25 billion by 2030, driven primarily by demand from China. (Dr Abdul Aziz Zakaria, 2020)

1.1.3 Malaysia Durian Varieties Registration for National Crop List

Basically, Malaysia durian is listed in “Varieties Registered for National Crop List”. Every durian listed have the variety registration number, currently registered is from D1- D215. Also carried the botanical name, variety description and images.

1.1.4 Correlation observed between durian prices and durian land prices

Correlation observed between durian prices and durian land prices (Shawn Ng, 2019). Data from the Federal Agricultural Marketing Authority (FAMA) showed average MSKD retail price spiked by 93.15% to RM70.50/kg in 2017 from RM36.50/kg in 2013. But in 2018 retail price fell by 35.53% to RM45.45/kg.

1.1.5 Discussion about total durian plantation in Malaysia

According to World Bank arable land (hectares) in Malaysia was reported at 826,000 ha in 2020 and the World Bank collection of development indicators, compiled from officially recognized sources. Malaysia – Arable land (hectares) – actual values, historical data, forecasts and projections were sourced from the World Bank on March of 2023. (Trading Economics, 2023)

Based on Food and Agriculture Organization of United Nation (FAO) that Malaysia has 33 million hectares of total land and only 7.5 million hectares is cultivated area, which 5.7 million hectares of perennial agricultural tree crops which are mainly rubber, oil palm, cocoa and coconut. But FAO stated arable land is 1.8 million hectares but actual facts only 826,000 hectares by 2020. (FAO, 2011)

Comparatively the land used for Durian crops in Malaysia are relatively small, only 1.3% of total cultivated areas and 10% of arable land.

1.1.6 Malaysia durian annual export or revenue of government

In 2021, production of durian in Malaysia is estimated 448,270 metric tons. If estimated value at RM15 per kg then it translates to RM 6.7 billion. For durian and MD2 pineapple, Malaysia is targeting an increase in export trends to countries such as China, Australia and New Zealand, which will contribute to higher export income,” (Anis Hazim, 2023)

The Ministry of Agriculture and Food Security said, in 2021, durian became the main fruit commodity as the country produced 448,272 metric tons (MT) and exported 24,684MT in a single year, with 85,280ha of planting area.

“The local durian is in high demand because it has a distinct fresh flavour and excellent quality,” Statistics show that per capita consumption of durian is 12.8kg per year, while its self-sufficiency rate (SSR) reached 104%, according to the Department of Statistics Malaysia (DoSM). “This proves that durian production is sufficient to meet domestic demand and has great potential to be marketed abroad,” the ministry said.

“The value of durian exports in 2016 recorded RM69.9 million, in 2017 RM59 million, 2018 RM124.9 million, 2019 RM127 million and in 2020 recorded RM144.7 million,” (Bernama, 2021)

1.1.7 Malaysia durian market share in total world – export

The global durian fruit market is projected to grow at a CAGR of 8.2% from 2022 to 2027, reaching a size of USD 9,891.81 million. Southeast Asia dominates durian production. Malaysia's durian exports surged by 107% in five years, hitting \$34.7 million in 2020. The top importers include Hong Kong, China, Singapore, the US, and Australia. Government support, such as tax exemptions, boosts Malaysia's durian competitiveness. While Thailand leads global durian exports, Malaysia, with a 4% share, is a key player. China, importing 66%, is a dominant market. MSKD, highly demanded for its flavor, faces a severe supply shortage. Despite high domestic consumption, export limitations necessitate increased supply to meet global demand, presenting an opportunity for market growth.

1.1.8 Nitrogen Quick Freezing Process (NQFP) agreed by China custom to export to China and trade agreement.

“Quick freezing or rapid freezing of food by exposure to a blast of air at a very low temperature. Unlike slow freezing, very small crystals of ice are formed which do not rupture the cells of the food and so the structure is relatively undamaged. A quick-frozen

food is commonly defined as one that has been cooled from a temperature of 0 °C to –5 °C or lower, in a period of not more than 2 hours, and then cooled to –18 °C.” (Oxford University Press,2023)

Particularly in Malaysia, durian is only harvested at 100% maturity, with the best taste and quality, therefore Malaysian durian is very popular and can be sold at a higher price compared to Thai or Vietnamese durian. The weaknesses of fully ripe durian can only be stored for 3 days at a temperature of 30 degrees Celsius, therefore, durian packaging facilities in Malaysia started to use Durian freezing by liquid nitrogen technology to retain its freshness of the whole durian after harvesting and were able to extend the storage period up to 18 months. Technology of durian freezing by liquid nitrogen is a new freezing method in which the whole fruit is directly exposed to liquid nitrogen gas to freeze the product immediately. Compared to the traditional compressor freezing method, which takes an average of 6-8 hours to freeze a 40-foot container reaching -18 degrees Celsius, Durian freezing by liquid nitrogen method reaches -18 degrees Celsius in just 1 hour, many times faster than usual.

The durian freezing by liquid nitrogen method helps to lower the product temperature quickly by penetrating beyond the heat resistance of the product and creating ice around it, helping to lock in natural flavours, nutrients, and moisture. Durian freezing by liquid nitrogen prevents water loss up to ten times more effectively than conventional freezing methods and reduces the harmful effects of frozen water crystals on the microstructure of fruit flesh tissues during freezing. (Linde, 2023) Liquid nitrogen cryogenic freezing process are mostly used for export market as the result of keeping the fruit is much better and after thawed the fruit looks like fresh and widely accepted by customers worldwide.

China’s General Administration of Customs (GACC) has approved imports of frozen whole durian fruit starting May 30 following an agreement signed in August, said Deputy Agriculture and Agro-based Industry Minister Sim Tze Tzin. (Bloomberg, 2019)

China just loves Malaysian durians – and with an expected 1,000 tons of whole frozen durians from the Southeast Asian nation expected to enter Chinese markets each month, Malaysia is only too happy to indulge that affection. Durian exports to China are expected to contribute close to 500 million ringgit (US\$120 million) to the nation’s total export value annually, said minister of agriculture and agro-based industry Salahuddin Ayub. Speaking to the press as the first shipment of fruits were about to depart to China, the minister said more and more Malaysian companies are hoping to obtain permission to export there. Malaysia’s big durian dreams as it seeks to expand exports to China 1 Jun 2019. Also, present was Chinese ambassador to Malaysia Bai Tian, who said there were “300-400 million mid-income customers” in with more and more direct corporation between the Malaysia durian plantation’s owner with China’s strong networks distributor, we can anticipate that the export of MSK will be increased tremendously.

1.1.9 Durian plantation compared to other crop like palm oil, rubber and rice.

Prior to GACC approval for Malaysia MSKD export to China and the Nitrogen quick frozen process, durian price is always inconsistent and very much depends on supply and demands. With the GACC approval and Nitrogen quick frozen process, MSKD price is consistent and increase year to year steadily. Therefore, many big corporations are starting to invest and planting MSKD as the option to other crops.

1.1.10 Government support in varies crops

“A total of RM70 million is allocated to improve the palm oil industry’s sustainability, including encouraging the recycling of palm waste material” Minister of Finance Tengku Datuk Seri Zafrul Abdul Aziz said. (Cynthia Ignatius, 2022)

Below are many subsidies for palm oil, rubber and paddy farmers;

- RM256mil for rainy season assistance for rubber smallholders will benefit some 320,000 farmers.
- RM1.8bil allocation for subsidies and incentives for paddy farmers, fishermen and smallholders.
- Government to introduce an agriculture protection scheme.
- o RM228 million in aid for paddy farmers. This will benefit 240,000 people.
- o Additional tax deductions for employers who hire former residents of juvenile detention centres.
- RM1 billion to fund agro-food programme.
- Government to support automation initiatives in the plantation sector.
 - o RM70 million to support the Malaysian Sustainable Palm Oil (MSPO) certification programme.
 - o RM40 million to encourage smallholders to diversify their crops.
 - o RM315 million to rubber planting programme.
 - o RM56 million to support sustainable farming.
 - o RM228mil assistance to benefit 240,000 paddy farmers.

The Ministry of Plantation Industries and Commodities (MPIC) has provided a wage subsidy of RM36 million to encourage the downstream rubber industry players to recruit local workers. (Malaymail, 2021)

On 31 December 2022, the Minister of Agriculture and Food Security (MAFS) Mohamad Sabu announced that special assistance from Padiberas Nasional Berhad (BERNAS), it is estimated that 240,000 farmers across the country will receive the benefit from BERNAS' contribution which total of RM60 million. (BusinessToday, 2023) Palm oil, rubber and paddy farmer always get the support from government in many forms including cash subsidy, fertilizer subsidy, levy cut for foreign worker hired, tax deduction and etc. Unfortunately, durian plantation does not get the similar support. Traditionally durian is planted by small orchard or second crop in the same plantation like a small area of rubber plantation allocated to plant durian, and do not view as big industry crop. With the new scenario like able to export to China and nitrogen quick frozen process, planting durian has become corporatize and many big corporations started to invest and plant in the bigger scale and which usually do not require government subsidy and mostly using their internal fund to develop the business.

1.2 Problem Statement

Since the China customs (GACC) approved Malaysia frozen durian to export to China in 2019, only MSKD is suitable to fulfil this requirement and MSKD is also well accepted by the China customers. In order to export the MSKD to China there are two main challenges faced by most of the plantation owners or plantation companies. Operation related challenges to export to China market and financial related issues of export MSKD to China market. Below is the chart to proof that prior to approval by GACC the MSKD production is low, pick up after 2019 and continue growing. In order to increases the production, cost of land and planting is crucial (refer to 1.1.5 Correlation observed between durian prices and durian land prices) and to get the facilities of NQFP (Refer to 1.1.9 NQFP).

Operation related challeges: Malaysian frozen whole durian and exportation to China are still at the infancy stage compared to Thailand. Challenges in exporting durian to China are abundant, especially to comply with the sanitary and phytosanitary (SPS) measures, stringent tariff rate, quota and other non-tariff measures (e.g., trademark, copyright and patent protection). As mandated in the quarantine protocol, durian destined for export must be harvested from farms registered with DOA of Malaysia and fulfil the MyGAP standards as established in the Codex Alimentarius Commission, specifically CODEX STAN 317-2014 (FAO 2014). For

frozen whole durian, the processing facility must be registered with DOA and certified with Good Manufacturing Practice (GMP). Finally, the facility must pass requirements and inspection from the GACC. (Suhana Safari et al., 2021)

1.3 Research Objectives

The research main object is to explore the MSKD characteristic, MSKD plantation challenges, MSKD current situation in exporting to

China and to recommend suitable supply chain to export MSKD to China;

- 1) To identify the MSKD tree characteristic and requirement like weather and suitable land altitude.
- 2) To study the challenges faced by the farmer for MSKD plantation in Malaysia.
- 3) To evaluate the current export situation of Malaysia MSKD to China.
- 4) To recommend supply chain logistic model for MSKD export to China.

1.4 Research Questions

- 1) What is the MSKD tree characteristic and requirement like weather and suitable land altitude?
- 2) What are the challenges faced the farmer for MSKD plantation in Malaysia?
- 3) What is the current export situation of Malaysia MSKD to China?
- 4) What is supply chain logistic model for MSKD export to China?

1.5 Limitation of the study

Durian plantation in general is still very young industry compared to Palm Oil, Rubber and Paddy industry. Therefore, limitation in access to establish data and not many organizations compile the data. Even the Malaysia Statistic Department don't have an organized way to regularly collect the data. In term of government funded board or association, still not as organize as Palm Oil or Rubber Board. Only few private formed associations and some university which have agriculture department will have R&D department which are able to assist plantation. Mostly, planting durian are learned or inherited the skill from some experience planter or guru.

2. Literature Review

2.1 Malaysia

2.1.1 From farm to China: A case study of Malaysian frozen whole

Malaysia has enjoyed substantial growth in durian export since the country gained market access to China. In 2018, a new export protocol for frozen whole durian was promulgated and signed between both countries. (Suhana Safari et al., 2021 p1).

Traditionally, importation of durian into China transits in Hong Kong via legal, illegal or grey distribution channel (Malaysia External Trade Development Corporation [MATRADE]2016). Durian trade is estimated to increase, with Malaysian durian establishing a foothold in Guangdong (ChinaAg2017).

An export protocol for frozen whole durian was agreed upon between Malaysia and China, followed by the beginning of the export activity in 2019 upon approval and premise auditing by the GACC.

Challenges in exporting durian to China are abundant, such as complying with the sanitary and phytosanitary (SPS) measures, stringent tariff rate, quota, trademark, copyright, patent protection, and the poor cold chain infrastructure in China. Frozen whole durian requires robust cold chain infrastructure. (PMA 2016).

2.1.2 Channels of Distribution in Malaysian Organic Durian: Case Study Approach (Suhana Safari et al. 2023)

The demand for durians has led to the overuse of non-permitted pesticides and artificial ripening agents, impacting the environment and human health. In response, Malaysia's National Agricultural Policies (NAPs) and the Malaysian Agriculture Research and Development Institute (MARDI) have promoted organic durian cultivation. Despite its premium market status, organic durian farming in Malaysia remains limited, with only 19.76 hectares under the myOrganic scheme. The market for organic durian in China is promising, but effective marketing strategies focusing on taste and health are needed. The supply chain for organic durian involves direct and one-level channels, with challenges in production and pest management. Currently, the yield of organic durian is below the breakeven point, necessitating time for product promotion and support for plantation and marketing efforts to promote organic Musang King durian to China.

2.1.3 The case of MyGAP for durian farming in Pahang, Malaysia (Yuichiro Amekawa et al, 2017)

ASEAN Association introduced Good Agricultural Practices (GAP) standards to improve the safety and quality of agricultural produce due to increasing use of pesticides and concerns of food safety (Schreinemachers et al.,2012). The effectiveness of awareness regarding MyGAP certification for MSKD plantations varies. Certified farm managers understand MyGAP rationale, while only half of uncertified managers do. Many certified managers joined for durian export eligibility, not quality improvement. They rarely benefit from certification but maintain field records and handle pesticides better. This differs from a study of Thailand's Q-GAP highlight regional differences. MyGAP is essential for MSKD growth and export to China, but some face challenges in registering with MyGAP.

2.1.4 Exploring Accounting Practice for Durian Producer Listed Companies in Malaysia (Saifulrizan et al., 2022)

The study assessed Malaysia's listed companies' accounting practices for durian fruits and trees. Lack of standardization in recognizing durian plantation assets was noted. Companies follow different methods, with some using MFRS 141 and MFRS 116 requirements. PLS Bhd classified biological assets as current and non-current in its 2020 report, while Ayer Bhd recognized fair value gains or losses in the profit and loss statement and cash flow statement. Bearer plants were initially recognized at cost and

later measured at cost less depreciation and impairment losses. Hence, it can be comprehended that the cost of bearer plants that can be capitalized comprised of the followings:

Plant + planting cost + land preparation + drains construction + roads irrigation + fertilization + labour + directly attributed overheads

The above costs amortized/depreciated starting from the date of maturity of the rootstock (plant).

Standardizing accounting for MSKD plantations is essential to support MSKD exports to China.

2.2 Thailand

2.2.1 Durian – Chinese Cold-Chain Logistics (Hermann Gruenwald, 2022)

The demand for durians, especially Mon Thong variety, soared in China. Durians are harvested, inspected, and prepared at farms in Thailand, then transported to Laemchabang seaport and sent to Hong Kong before distribution to Chinese regional markets. In 2021, Thailand exported 580,000 tons of durians (US\$2.3 billion) to China, with a predicted 20% year-on-year increase.

In Thailand, the fruit is harvested when 70% ripen as it will ripen in 3-months-time. NQFP is not needed. Comparative to MSKD, this is less costly to transport, therefore lower selling price.

2.2.2 Export Competitiveness of Thai Durian in China Market (Saowanit Noodaeng, 2017)

Thailand is the world's largest durian exporter which accounts for 90% of the world production. The free trade agreement cancelled the tariff of HS (07) and HS (08) chapters of the products (vegetables and fruits), resulted in rapid development of Thailand's tropical fruit in Chinese market. However, Thailand is facing higher competition with Malaysia and Vietnam. Thailand holds 3 main competitiveness in China durian market;

- (1) The durian trade between China and Thailand are mainly based on the highway and waterway transportation.
- (2) China-Thailand free trade agreement between the two countries has a long history of implementing "zero tariff" on fruits and vegetables. Trade between Thailand and China developed rapidly after the establishment of diplomatic relations in July 1975.
- (3) The Revealed Comparative Advantage (RCA) values of fresh durian in Thailand show that Thailand has a dominant comparative advantage in China. Thailand is the only country allowed to import fresh and frozen durians to China, while Malaysia export frozen durians and Vietnam through the border trades.

2.2.3 Factors Affecting the Durian Production of Farmers in the Eastern Region of Thailand (Supat Thongkaew et al., 2021)

Durian farmers population comprises 61.77% male, average age of 49.89 years, secondary school level, 19.98 years durian planting experience, 3.77 persons in their households, 2.61 persons in 6.12acre durian planted area, have own funds at 66.76%, in debt borrowing 292,483.87baht (RM38,554) per household. The production cost 14,584.84baht (RM1,922)/0.4acre with an income of approximately 94,133.64baht (RM12,408)/0.4acre, while average durian production is 1, 321.21kg/0.4acre. Various fertilizer solutions and methods are used in different stages of the durian cultivation. 97.98% of farmers are pruning their trees, 62.03% spared two generations of durian, 98.64% pollinating flowers from 18.00 onwards, 98.23% branching their trees, and 116.38-day-old durians are collected. 66.84% of farmers have collectors and traders to export durian and 58.99% accept wholesale business. Only 29.87% were guaranteed by the GAP standard.

Durian production is affected by farmer's age, workforce, type of durian, planted area and number of trees. When workforce, planted area and number of trees increase, production increases. Growing organic durian will have fewer outcrops than conventional durian. As for increase in age, production decrease because lack of knowledge in technology, but increase with planting experience. This paper provides statistic for MSKD grower to increase production.

2.2.4 Thai Export of Durian to China (Wannarat et al., 2018)

By 1990, the volume of Thai fruit re-exported to China had risen to 50-70% of the total export volume. In 2000, Thailand's fruit has expanded direct exports to China (Suksangworawong, K. 2008)1.

Thai durian exports increased because:

- Industry development in Thailand – systematically, aggressive
- Chinese entrepreneurs in Thai fruit trading – aggressive development to second-line and third-line cities
- Transportation improvements in Mekong sub-region
- Change of Thai durian export process

2.11 Research Gap

In the literature review, many topics discussed above export to China especially Monthong durian, none of the topic discuss about operations related challenges to export MSKD to China Market, needed to highlight here that MSKD characteristic is far different from Monthong (please refer to “Comparison of Malaysia’s durian versus Thai’s durian”) and the requirement is totally different. Most of the article’s discussed topic is related to durian planting, management, diseases, farmer difficulties and etc, very few or none of the topic related to “Financial related issues of export MSKD to China market”. Above research gap identified and Porter Five Forces Model will be used as the recommendations in this project paper.

3. Research Methodology

The objectives of this consulting project are to understand the operational challenges and financial issues faced by Musang King Durian (MSKD) farmers when exporting to the Chinese market. The analysis will be based on the Supply Chain and Cost Mapping Toolkit (SCCMT) developed by the Supply Chain Cost Effectiveness and Swift Service (SUCCESS) team, which has been successfully used by global food manufacturers. The analysis will identify time, cost, and challenges in the supply chain, extending to the farming stage. Secondary data from government departments and other sources will be used to construct projections up to 2030 for the world durian market size, China's import market size, and Malaysia's durian production volume, focusing on MSKD. The aim is to explore the possibility of achieving a 10% market share in China by 2030 and identify the challenges faced by MSKD plantations.

4. Data Analysis and Findings

Bar chart and pie chart will be used as the tool to analyse the data. Secondary data from DOA, MAFI, MOA, GACC, plantation owner and other publications will be used.

4.1 Analysis on the possibility to achieve 10% of China market share by 2030

Durian Market Size Outlook: World / China

According to data from the Ministry of Commerce in Thailand, China was the largest export market for Thai durians in 2022, accounting for more than 96 percent of the total export volume, valued at 3.09 billion U.S. dollars. (Wang Yuanyuan et al., 2023)

In 2022, Thailand exported durian with a total value of USD 3.219 billion. (Khaosod, 2023)

Assumption 1: Basic to calculate the market size;

2022: USD 3.09 Billion = 96% of China market size

2022: Total China market size = USD 3.22 Billion = 66% of world market share.

2022: Total world market size = USD 4.88 Billion

Assumption 2: The durian fruit market is estimated to grow at a CAGR of 8.12% between 2023 and 2030 (Technavio, 2023).

Assumption 3: China dominated global imports 66% (Durian Harvest, 2021)

Analysis: To check the Malaysia MSKD export to China possible to achieve 10% of China Durian Market share by year 2030

(Comparison of MSK Export VS 10% China Market Share - Based on 8% YOY growth rate)

Assumption 1: MSKD export price based on USD10 per kilogram from
 2023 – 2030

Assumption 2: 2023 MSKD export to China estimated at USD424 million.

Assumption 3: Year on year growth rate – 8%

4.2 Findings of analysis on the possibility to achieve 10% of China market share by 2030

Based on the researcher projection table Analysis above. By year 2030, Malaysia MSKD export to China will be exceed 10% of China Durian market share. The projection MSKD export value for year 2030 is USD 732 million and that will be 12.2% of market share. This figure is achievable as long as the growth of plantation is maintained, the MSKD export price is maintain or increases and non-drastric changes of GACC.

4.3 Supply Chain and Cost Mapping Toolkit (SCCMT).

Calculation of per kg cost (20 Acres land amortized in 20 years)												
Estimated production for 20 years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 1-20	
Estimated Land size used for Musang King	18	18	18	18	18	18	18	18	18	18	18	18
Estimated no of trees in 1 acre of land	30	30	30	30	30	30	30	30	30	30	30	30
Estimated Durian fruiting per tree per year	0	0	0	0	30	50	80	80	100	100	100	100
Estimated Durian weight per durian	1.5	1.5	1.5	1.5	1.5	1.5	1.8	1.8	1.8	1.8	1.8	1.8
Total kg	-	-	-	-	24,300	40,500	48,600	77,760	77,760	97,200	972,000	1,338,120
Expenses												
Nursery Plant	43,200	-	-	-	-	-	-	-	-	-	-	-
Fertiliser	216,000	259,200	311,040	373,248	447,898	447,898	447,898	447,898	447,898	447,898	447,898	447897.6
Administration Cost	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20000
Salary - management	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60000
Salary - farm workers	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144000
Land cost	4,520,000											
Total Cost	5,003,200	483,200	535,040	597,248	671,898	671,898	671,898	671,898	671,898	671,898	6,718,976	17,369,050
												Cost per kg
												12.98

Table: SCCMT cost data

4.4 Findings

Based on the information and analysis, below are the findings of the research questions;

1) What is the MSKD tree characteristic and requirement like weather and suitable land altitude?

MSKD trees require 5-6 years to start fruiting and necessitate specific conditions, such as flat terrain, loamy soil with a pH of 5.5 to 6.5, ample rainfall, and access to uncontaminated high-quality water. The ideal altitude for MSKD plantations is between 50 to 500 meters above sea level on gentle slopes with a contour gradient of 30 degrees. The central spine of Peninsular Malaysia, particularly locations like Raub in Pahang and Gua Musang in Kelantan, offers optimal conditions for MSKD cultivation.

2) What is the challenges farmer faces for MSKD plantation in Malaysia?

According to the SCCMT model, farming constitutes the highest costs (RM12.98/kg) and time (more than 5 years). Major challenges include working capital, high land costs (approximately RM5 million for 20 acres), and the need for larger plantations to be commercially viable. The first six years involve substantial working capital for nursery trees, yearly expenses, labor, administration, maintenance, licenses, and miscellaneous costs, totaling RM8-10 million.

3) What is the current export situation of Malaysia MSKD to China?

Multiple business models exist for MSKD exports to China, with big plantations having their facilities and licenses and NQFP companies partnering with local plantations. The export scenario involves complex logistics and significant costs, with a need for

refrigerated containers and storage. Two supply chain models prevail: independent parties with potential issues or integrated plantations and NQFP facilities, trending due to enhanced efficiency and reduced problems.

4) What is supply chain logistic model for MSKD export to China?

Export and China inbound logistics for MSKD incur substantial costs, considering the need for refrigerated containers and storage. The current supply chain models include independent parties and integrated plantations with NQFP facilities. The latter is becoming popular, reducing potential issues between parties and ensuring better product quality and cost efficiency. Efficient supply chain models are crucial to meet the growing demand for MSKD, particularly in the Chinese market.

4.5 Challenges

Challenge 1: Operations related challenges to export MSKD to China Market

Effective logistics play a pivotal role in handling Musang King Durian (MSKD) due to its swift ripening process. Ensuring prompt transportation from the farm to processing centers, ideally within a day, is imperative to prevent spoilage. The use of specialized containerization is essential, with refrigerated storage and containers maintaining a temperature of -20 degrees Celsius during the export journey. Substantial costs are associated with NQFP and packaging facilities, necessitating a minimum investment of RM30 million. Failure to comply with NQFP standards impedes exports to China, as GACC approved only the frozen form of Malaysian MSKD in 2019 (Malaysmail, 2019). Road transport from MSKD plantations in Kelantan and Pahang to seaports involves additional expenses, making Malaysian MSKD less cost-effective than Thailand's durian, which doesn't require such specialized transport and packaging.

Challenge 2: Challenges to achieve 10% of durian market share in China by 2030.

The challenge of achieving a 10% durian market share in China by 2030 is underlined by Malaysia's robust 2021 durian production of 446,270 metric tons, sufficient for domestic needs. However, export volumes, particularly MSK durian, remain limited, compounded by the necessity for NQFP compliance for exports to China. Research indicates the feasibility of reaching the 10% market share by 2030, but significant considerations arise. The MSKD plantation faces minimal government support, with private sector funding dominating development. Financial obstacles include higher durian plantation costs, especially in Pahang and Kelantan, posing challenges with land expenses, expensive nursery trees, substantial fertilizer requirements, labor needs, and meticulous care throughout the cultivation process.

Challenge 3: Financial related issues of export MSKD to China market.

To export the MSKD to China, there are many requirements, from the practice of plantation like control chemical level, fruit tracing system. MSKD export to China must be in the frozen form which required NQFP, special packaging, special transportation like refrigerator container and refrigerator storage and so on. All these required huge amounts of investment and expenses and these are financial challenge for MSKD plantations, MSKD NQFP and exporters. All the cost of investment in MSKD plantation, NQFP and facility by exporter required huge amount of financial cost. How long the Return of Investment?

The government offers minimal incentives, limited to waiving export taxes, unlike other crops with more benefits. Banks provide only normal business loans, and financial assistance is lacking. Durian associations in Malaysia, such as MIDIDA and MDEA, offer support but no financial assistance. Financial issues extend to packaging requirements and logistical costs. Unlike other crops, durian plantations receive no subsidies, in contrast to palm oil and rubber plantations that enjoy government support. Paddy plantations also receive government support, including cash contributions and profit pledges, fostering a more competitive agricultural sector.

5 Recommendation and Conclusion

5.1 Contribution of this project paper.

This project paper will assist main 3 categories of business entities;

Category 1: New entrance or new investor. MSKD are popular for many years, well known and accepted to export to China and the selling price is the highest among all types of durians. Therefore, many businesses or investors are very keen to invest in MSKD plantation.

Category 2: Small durian orchard intended to expand and export to China. This group of plantations owners understands the durian market and has made good incomes from durian plantation and have intentions to expand their business.

Category 3: Big plantation whom have good networking to sell locally or export overseas especially to Singapore by fresh durian. Basically, this category of plantation owner is more eager to explore to export to China.

This project paper will provide them in-depth understanding of all information about durian, investment cost required and challenges in the plantation, and challenges to export to China. Especially NQFP and logistic to China.

This paper also provides detailed costing based on the current situation to set up plantation and related costing until harvesting. This will form a format for future researcher to continue study especially plantation business model, NQFP and logistics model to export to China.

5.2 Recommendation to answer the challenges of the objective

The recommendation will be based on Porter Five Forces model.

Threats of New Entrants – Low Level

In this challenge for the above 3 categories of business entities are high investment cost for land, NQFP facilities and advanced technology for modern plantation. In short it is financial facility to start up or expand the MSKD planting and export to China. Category 2 & 3 are much easier to secure loan facility from financial institute as they have land to mortgage and business revenue record, but need professional financial to advise them to prepare proper proposal which will be accepted by financial institute. For category 1, posted more challenges as no land to mortgage and no business record. In this situation, propose to get freehold land, even the cost is higher but able to get up to 50% loan from financial institute. Raise fund from the relatives or smaller investor will be much easier, in this case the owner will need to prepare a business proposal to present to smaller amount of investor, as small as RM 10,000. The business proposal has to be sincere and realistic return, most important is legal binding to protect investor. Many big corporations (Category 2 & 3) are doing this very aggressively do this, unfortunately the marketing cost become so high and will cost the investor return in future. As for the category 1 also have that activity to raise fund but always lack of transparency and legal binding. Therefore, to propose to get financial from bank, government financier and retail investor. The MSKD plantation need to be transparent, keep proper accounting records and manage the plantation with modern technology and proper records.

Bargaining Power of Suppliers - High Level

Meaning MSKD plantation as the supplier of MSKD to export to China have higher level of negotiation because MSKD has limited produces and most of the big plantation export to China directly. In order to get the original taste of MSKD, the DNA of the tree play a very important part as the same tree planted in the different area will have different taste, it is similar to the grape that produces good wine, it has to be in the same region. For MSKD, it has to be the right altitude 100-500 above sea level, weather similar to Gua Musang (origin place) or Raub. Flowering period need to be hot and no rain but sufficient water. The MSKD tree needs lot of water but retain water in the soil will kill the tree, therefore slopy land scape is important and good source of natural water for irrigation.

In France, Bordeaux region is the world most famous wine producer and Chateau name is a brand used in that region. Like Chateau Lafite is the most expensive wine in the world. The government or association has verified the wine produced in the region only can only use Chateau, therefore the strong branding and well protect.

MSKD have the similarity characteristic, like special way of planting and unique taste of MSKD, Malaysia Agriculture Ministry and Durian Association should follow what the wine industry do. QR code with ministry certification should be implemented. The QR code will enable the durians to have traceability and consumer can differentiate MSKD origin and the genuine quality assurance.

Bargaining Power of Buyers – Low Level

MSKD is limited supply, more favourable than other durian in China, no substitute durian yet and low-price sensitivity. Buyer here we referred as the China Importer. Even though the bargaining power of buyer is low but the number of Malaysian MSKD exporter approved by the GACC is limited and the unofficial partnership had formed. In order to have better supply channel, below is the propose logistic channel and partnership.

Malaysian company is more familiar in MSKD plantation therefore, they will be more effective if they control the majority in management will be mor effective, NQFP will be more efficient for China business partner to control as the GACC requirement and consumer demand will be mor familiar by the China company. Most of the companies in China which are fruit importer, always have access to the big China distribution network and are very experience in cold storage. This proposal is in the ideal situation.

Threats of Substitute – Low Level

MSKD characteristic is still no substitute, MSKD tree can only be planted at certain weather and area, the same species planted in different location will have different taste.

Branding and education to consumers are crucial to protect the substitute. Learning from wine industry, MSKD should become a brand and Malaysia Agriculture Ministry to set up MSKD board to educate and promote like palm oil industry done by MPOB. MSKD plantation owner also have to play the important role in promoting MSKD, actively participating in international trade show, especially in China to promote and educate consumer to learn the uniqueness of MSKD and differentiation to another durian.

Competitive Rivalry – Low Level

Less direct competitor due to MSKD characteristic and at the current moment the demand is higher than supply. The main competitor for MSKD is Thailand Monthong Durian. At this moment, in term of price level MSKD is far more expensive almost double. Secondly, the taste of MSKD is much more pungent and tastier.

Propose Malaysia Agriculture Ministry to set up MSKD board and set standard and certified the quality of MSKD when sell domestically and for export. Malaysia Standard by SIRIM also can assist in this area by putting parameter and let all the MSKD plantation apply and get the certification. This practice is successfully implemented in the electronic goods for domestic and export.

7. Conclusion

In the beginning of this project paper, we are able to analyse and understand MSKD for its fruit, plantation and market, especially export to China Market. In comparison to the main competitor's products like Thailand durian (Monthong) is clearly distinguish the advantages and benefits of MSKD. The findings of the research questions have been clearly stated and recommendations to answer to all challenges by using Porter Five Force model and SCCMT to give in-depth figure to support the proposals. The researcher projection in China durian market size shown that by 2030, Malaysia is able to achieve 10% of China market share. This achievement is significant for the MSKD plantation in Malaysia. The MSKD tree characteristic and requirement like weather and suitable land altitude had proven that the most suitable location is Gua Musang and Raub. The challenges faced by the MSKD plantation had been analysed and the main issue is the financial and, in the proposal, the way to secure financial had been given. Current export situation of Malaysia MSKD to China had also been shown above and very much controlled by GACC approval. A few supplies chain logistic model currently practice had been discussed and propose of an ideal supply chain, SCCMT model use to get clear cost factors.

The conclusion is, in 2030 MSKD able to achieve 10% of China Durian market share. In term of the ideal location to plant MSKD are Gua Musang and Raub. Financial issue faced by the MSKD plantation owner possibly to secure from retail investor and financial institute. The ideal logistic model proposed to reduces problems faced by export.

The researcher tried the best to gather information from all the resources to put into this project paper and proposal. The proposal may not be perfect but many business factors and actual scenario has been taken into consideration. The researcher hope is that in the future someone will continue the same topic and assist to the MSKD plantation in Malaysia.

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