

# Exploring Opportunities and Threats in Logistics and Supply Chain Management of Thai Fruits to India

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**Abstract—** Recently countries are gaining opportunities and confronting obstacles arising from global supply chain integration. The main objective of this paper is to explore business opportunities and threats in terms of logistics and supply chain management of exporting Thai fruits to India. Supply Chain Analysis (SCA) framework is used to analyse the business opportunities and logistics management in India market in schemes run by the modern trade to assist smallholders with production and marketing. The study, consequently, intends to explore empirically the pattern of Thai fruits supply chain management and restructuring in India market. The patterns of logistics and supply chain management found in this study are substantiated and linked with the existing modern trade scheme to see whether there are inconsistencies in the policies and actual implementations. This presents threats as well as opportunities for smallholders in Thailand. The standard set by buyers requires farmers to adjust their production and marketing systems. Assurances for farmers are derived from modern trade and government and collaborations amongst these two parties. MICE is proposed to be a mechanism to promote opportunities of exporting Thai fruits to India.

**Keywords—** Business Opportunity, Logistics and Supply Chain Management, Tropical Fruit, Thailand, India

## 1. Introduction

India was a country with the second largest economy in Asia after China, and the ninth largest economy in the world according to the rankings of GDP (PPP) from the IMF statistics in 2015, with 7.375 trillion dollars (IMF, 2015) [1]. Thailand emphasized on the economic potential of India in terms of growth rates of economic and market size that the middle-income and high-income peoples with high purchasing power were approximately 3% of total population or more than 35 million peoples in 2014.

Consequently, Thailand and India had a free trade agreement (FTA) in both the bilateral framework (Thailand - India) and multilateral (ASEAN - India and BIMSTEC), which was the vital foundation for the expansion of trade and investment between two countries. In addition, the private sector had a mechanism of cooperation between the business sectors which played a key role in promoting and expanding trade and business services as well as the Business Council of Thailand - India (Thai-Indian Business Council), which had a network of partnerships with the private sector of India.

In 2003, Thailand and India signed a framework agreement on the establishment of a Thailand - India free trade area (TIFTA). The essences of the framework agreement covered both the effects of trade liberalization in goods, services and investment as well as promoting cooperation in various fields. Later in 2009, the Association of Southeast Asian Nations or ASEAN that Thailand is a member state had signed the framework agreement on comprehensive economic cooperation with the Republic of India in order to establish the ASEAN - India free trade area covering trade in goods by 2013. Recently, Thailand and India were the members of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation Free Trade Area or BIMSTEC - FTA. BIMSTEC FTA is an important mechanism to help strengthen trade relations and investment of Thailand to South Asia especially India [2].

Table 1 presents the Trade value between Thailand and India (2011 - 2015). In the last 5 years during 2011 - 2012, the total dollar value of trade between Thailand and India have expanded from 8.16 billion USD in 2011 to 8.87 billion USD in 2012 or increased 8.06 percent,

particularly after the global economy recovered from the 2010 and the signing of a free trade agreement between Thailand and India. However, during 2013 – 2015, the total trade gradually decreased from 8.87 billion USD in 2012 to 7.83 billion USD in 2015 or shrank 11.75%. Especially in 2015, the total trade reduced 9.88% when compared to previous year. In addition, in this period the overall Thai trade surplus with India expanded from 2.11 billion USD in 2011 to 2.59 billion USD or increased 23.03% in 2015. Consequently, after 12th ASEAN-India summit held in Nay Pyi Taw, Myanmar on 12 November 2014, two countries aimed to increase trade value by strengthening the economic partnership and linkage between Thailand and India in all dimensions especially supporting to construct road under the collaboration among Thailand Myanmar and India.

**Table 1.** Trade Value between Thailand and India (2011 – 2015)

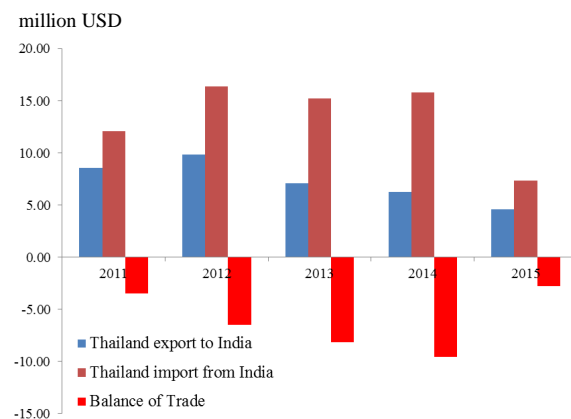
Year	Export		Import		Balance of Trade Value
	Value	%Δ	Value	%Δ	
2011	5,131.73	14.40	3,025.43	24.67	2,106.30
2012	5,445.75	5.77	3,426.14	11.7	2,019.61
2013	5,103.57	-6.70	3,501.14	2.14	1,602.43
2014	5,556.06	8.14	3,046.25	-14.93	2,509.80
2015	5,210.31	-6.64	2,618.84	-16.32	2,591.47

Source: Global Trade Atlas (2015)

In 2015, Thai Trade Center from Mumbai, India, reported the trade between Thailand and India that the top 5 India products exported to Thailand were chemical products (\$339.6 million), machinery and mechanical appliances (\$282.7 million), parts and accessories of the motor vehicles (\$279.3 million), precious stones and metals (\$251.5 million), and other ores and metal scrap; (\$215 million). On the other hand, top 5 products that India imported from Thailand were chemical products (\$607.4 million), plastics (\$582.1 million), jewelry (\$351.6 million), park-ignition internal combustion piston engines (\$311.0 million), and motor car, parts and accessories of the motor car (\$310.5 million).

In case of agricultural trade especially fruit, because Thailand and India locate in the tropical area where proper for growing and harvesting various kinds of tropical and subtropical fruits, the fruit trade value between 2 countries especially in HS code 08 was very small proportion compare to the total trade. Figure 1 shows the fruit import, export and balance of trade value between Thailand and India during 2011 – 2015. In this period, the surplus of Indian fruit trade with Thailand continuously increased particularly in 2014 that the India's fruit trade surplus with Thailand was \$9.56 million USD. This increased from previous year with the trade surplus was \$8.2 million USD or 16.59%. The major fruits which India exported to Thailand in 2015 were fresh

grapes (\$5.06 million USD) and fresh pomegranates (\$1.25 million USD) [3]. Table 2 shows the top 10 exported fruits from Thailand to India between 2012 – 2015, and the top 5 major Thai fruits were tamarind, longan, guava, coconut, and rambutan, respectively [3].



**Figure 1.** Fruit Import, Export and Balance of Trade Value between Thailand and India (2011 - 2016)  
Source: Global Trade Atlas (2016)

**Table 2.** Fruit Export Values from Thailand to India (2012 – 2015)

Rank	Fruit	2011	2012	2013	2015
1	Tamarind	500,340	775,202	824,809	1,070,152
2	Longan	624,269	317,112	462,821	658,224
3	Guava	4,999	31,901	51,952	40,334
4	Coconut	368	20,320	42,790	32,810
5	Rambutan	5,686	36,779	32,103	25,591
6	Dragon Fruit	3,920	37,750	15,837	19,145
7	Pomelo	329	5,096	4,046	14,558
8	Mangosteen	20,852	15,093	19,078	9,470

Source: Global Trade Atlas (2015)

According to fruit export statistics from Thailand to India found that there are many potential fresh Thai fruits in production and export to India, namely longan, sweet tamarind, guava, coconut, rambutan, mangosteen, and dragon fruit. However, the problems of fresh fruit trading and transportation from Thailand to India were the long distance between two countries and perishable nature of the fruit that need the optimal transportation mode and the cool chain in order to prevent damage and to keep them fresh. In addition, under the distribution system of India and complexity of Indian fruit market may not be suitable for Thai fruit trading in large quantities because of awareness of the consumers especially how to keep and eat. Under the globalization, logistic development and free trade agreement such as TIFTA, ASEAN – India and BIMSTECS, Thailand may have both opportunities and confront obstacles. The objectives of this paper are to investigate business opportunities and threats in logistics and to study the supply chain of Thai fruits from orchard to India market. The supply Chain Analysis (SCA) framework was used to analyses the business

opportunities and logistics management in India market in schemes run by the modern trade to assist smallholders with production and marketing.

In the literature, there are some studies about perishable fruit trade in aspect of value chain and supply chain analysis. FAO (2004) studied value chain analysis of mangoes in Kenya and found a number of structural problems [4]. Brown (2012) studied value chain of tropical dried fruits in Fiji and discovered that the fruit drying industry in Fiji was in infancy stage. Impediments and threats that existed to the development of dried fruit industry in Fiji were; the lack of adequate finance, lack of coordination with the relevant authorities, poor storage infrastructure, and the of knowledge and skills on dried fruit production of processors [5]. Zakari (2012) studied mango of Ghana and found that in a mango processing sector required adequate primary producers who produce quality and internationally certified fruits. [6].

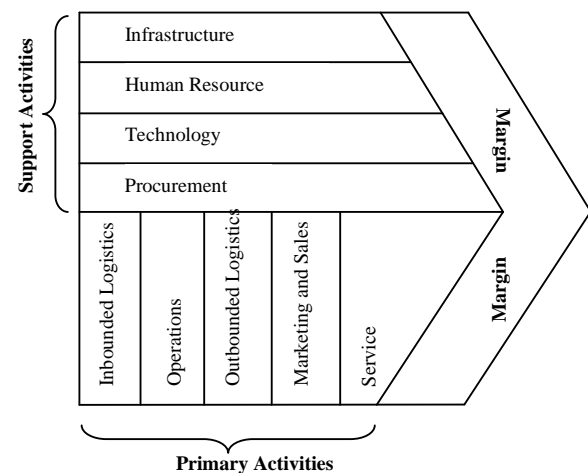
In case of Thailand, there are few studies about supply chain for export fruit. Tongdee et al. (2009) evaluated the issues relevant to Thai horticultural industry in order to understand the nature, characteristics and trend of horticultural supply chain in the dynamic changing market environments [7]. Later, Applied Economics Research Center (2010) researched the entire fruit moving from Thailand to China along the route R3E and R3W and Mekong River [8]. Kantabutra, et al. (2012) studied supply chain and logistics management for exporting Thai fresh mangoes to the Japanese market and explained six logistics activities occurred in exporting process, namely transportation, material handling, receiving and storage, customer service, inventory management, and packaging [9]. Tansuchat, et al. (2013) studied the situation and supply chain of fruit trade between Thailand and the Philippines and found that the implementation of AEC in 2015 will have a positive effect of increasing opportunity for Thailand to export fruits to the Philippines because Filipinos have a very positive attitude towards Thai fruits [10]. Nimsay et al. (2013) studied the export tropical fruits of Thailand, namely durian, mangosteen, rambutan and banana, to Myanmar and Laos in terms of trade chain of modern market which has been seen as a major opportunity for Thai traders to Lao PDR and Myanmar [11]. Saowadee et al. (2015) also studied the cross border transport between Thailand and Myanmar [12].

In contrast to Indian fruit supply chain research, there are many studies especially for strategy and modern supply chain. Tolani and Hussain (2013) studied strategic change in model of fruit and vegetable supply chain, found that fruit was the key role for the existence of customer and influencing in India's economy and there were many factors affecting to the supply chain which should be accept and development to order to improve supply chain

accumulation ability in India [12]. Negi and Anand (2015) studied on supply chain of fruits in Uttarakhand, and cold chain in India, and suggested to reduce the losses and wastages in fruits which affect to increase in farmer income, generate employments opportunities for the local people [13]. They also found that the cold chain in India was the weak link in supply chain, so major agribusiness should be participated to set up the cold storage, processing facility and refrigerated transportation for India's cold chain development [14].

## 2. METHODOLOGY

The value chain describes the activities needed to bring a product from the initial idea and conception to its final market in the supply chain. In food supply chain has been relationship involving many players, starting from primary producers or farmers, collectors, manufacturers or processors, exporters, importers, wholesalers and retailers, who collect fruits and sell them to the consumers. These activities include design, production, marketing, distribution and support services, up to the final consumers. This research based on Kaplan and Norton [12] and Value Chain Model of Porter [13]. The value chain allows alignment of processes with customers, and generates a quality advantage. The value chain focuses on cost management efforts and provides efficient processes which improve the timeliness of operations.



**Figure 2.** Value Chain Model of Porter

Source:

The value chain model of Porter [13] is distinguished in 2 parts, namely primary activities and support activities. Primary activities are directly concerned with the creation, production, logistic or delivery product or service to consumer. The basic model of Porters Value Chain is presented in Figure 2. They can be grouped into five main areas. (1) Inbound logistics refers to goods or input being obtained from the suppliers and to be used for producing the end product including sending, receiving, storing, inventory control, transportation scheduling of material to

manufacturing processes. (2) Operations are production processes that transform the inputs into the final product. At this stage through the production line, value is added to the product including production, and packaging. (3) Outbound logistics relevant to distribution activities to market such as through distribution centers: warehouse, transportation and logistics, distribution management, buy order fulfillment. (4) Marketing and sales involve activities associating with getting buyers to purchase the product including market channel selection, advertising, sales promotion, pricing, retail management and consumer demand analysis. The marketing mix is used to establish an effective strategy. (5) Customer service is support services that organization offers to customers such as customer support, sales training, guarantees and warranties.

Each of these primary activities is linked with support activities which help to improve their effectiveness or efficiency. There are four main support activities: (1) procurement relating to organization structure, management and control, and organization culture; (2) technology development (including R&D, design and redesign, and process automation), (3) human resource management (including recruiting, retention and compensation of employees and managers), and (4) infrastructure relating to organization structure, planning management and control, legal, finance and accounting, organization culture, public affair and information management [9].

### 3. DATA COLLECTION

The target area of this research is the supply chain and logistic of fruit exporting from Thailand to India especially longan, tamarind and other fruits. The data is collected from both primary and secondary sources. For primary data collection, semi-structured questionnaire was used and collected from stakeholder by in-depth interview, non-participant observation and field study techniques. The stakeholders in supply chain include fruit farmers, collectors, exporters, transport providers, customs, importers, wholesalers, retailers, and consumers. Later, the supply chain mapping is constructed in order to identify and explain key players, flows and supply chain collaborations. The purposing sampling and snowball sampling techniques are used in order to determine the target sample. Since this research is qualitative research, the content analysis and data triangulation are adopted in order to confirm the validity of qualitative data.

The secondary data, the import and export data are collected from various sources such as Thai and India customs, and Global Trade Atlas database. The information of air, sea and land transportation routes is gathered from transport providers such as searate.com,

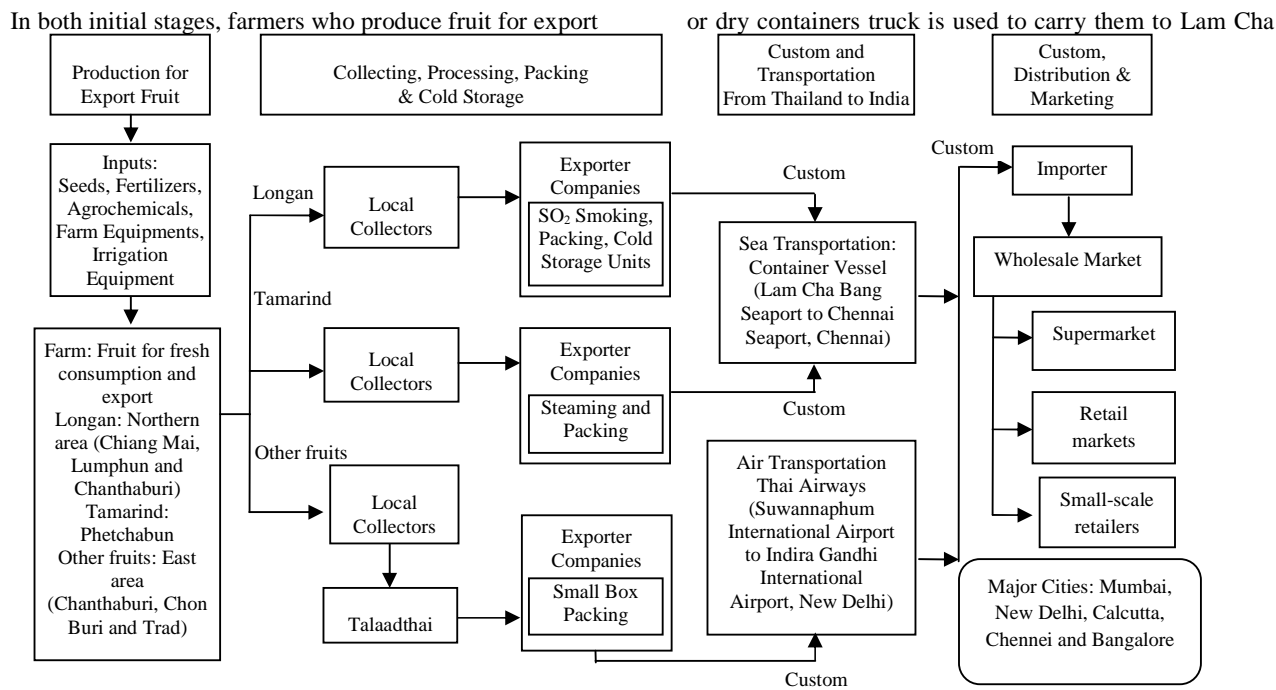
Thaiairways.com. The free trade agreements and trade regulations between Thailand and India are compiled from the custom and ministry of commerce of both countries.

### 4. EMPIRICAL RESULTS

Under the corroboration between Thailand and India, both countries have the advantages of the free trade agreements. In case of fruit trade, Thailand has been taken advantages from TIFTA that have clearly identified in HS code that the import tariffs of fruits from Thailand have been equal to 0 since 1<sup>st</sup> September 2006 such as guava, mango, mangosteen, durian, longan, lychee, rambutan, star fruit, jackfruit, tamarind, dragon fruit, sapodilla, rose apple, custard apple, and langsat. In contrast, although Thailand is one of state member of ASEAN, and the ASEAN has free trade agreement with India or ASEAN – India, only certain types of fruit, namely lychee, tamarind, custard apple, sapodilla and pomegranate, have obtained import duty benefit equal to zero since the end of 2013. However, longan, guava, mango, fresh grape and apple are in exclusive list and not reduce import tax to zero. Consequently, nowadays the Thai fruit exporters use TIFTA in order to receive the import tariff benefits. Unfortunately, in case of BIMSTEC cooperation that India and Thailand are state members, the trade agreement is unenforceable, because members could not make the conclusion of the tariff commitments in annex of the agreement.

The logistic system is vital for fruit exportation. The logistic of export Thai fruits to India involves various transportation modes from producers or farmers to consumers, and many activities such as warehouse management, collecting, packing, storage and exportation. Because most of Thai export fruits are perishable and fragile, and short shelf life, the postharvest technologies are indispensable in order to prolong their shelf life, such as packing, cold storage and reefer container. Based on the fruit export statistics of Thai custom, we classify them into 3 groups: (1) the perishable fruit exported in large quantity which is fresh longan, (2) dry fruit exported in large quantity that is sweet tamarind, and (3) other fragile and perishable fruits exported in small quantity are rambutan, mangosteen, guava, dragon fruit and rose apple.

Figure 3 displays the main stages of the Thai fruit export value chain to India. Firstly is fruit production of export. All processes relate to the necessary inputs comprising of elements needed for production, such as seeds, fertilizers, agrochemicals (herbicides, fungicides and pesticides), farm equipment, irrigation equipment, and knowledge and skills of farmers, and the growth and harvesting of the produce, such as planting, weeding, spraying, and picking.



**Figure 3.** The Fruit Value Chain Mapping from Thailand to India

must maintain and control the use of chemicals and pesticides before export and meet the good agricultural practice (GAP) requirement, because prior export, exporters are required to report to the Department of Agriculture in order to detect chemical residues and pests and to obtain the phytosanitary certificate which is very significant document for exportation. The major plantation area of Thai export fruits to India depend on a kind of fruit. The major areas for longan are located in both northern region (seasonal longan: Chiang Mai and Lamphun) and eastern region (off-seasonal longan: Chanthaburi) of Thailand. Sweet tamarind is grown mostly in Phetchabun. The other fruits, rambutan and mangosteen, are grown mostly in eastern of Thailand such as Chanthaburi, Chon Buri and Trad.

Second is collecting, processing, packing and cold storage. The fresh longans from orchard are gathered by the local collectors, and send them to the longan export factory. The sulfur dioxide is used to smoke the fresh longan in order to prolong for transportation and shelf life. The total weight of a longan plastic box is 11 kg. The exported longan boxes are loaded into 20 ft or 40 ft reefer containers. The container tractor carries them to the Lam Cha Bang Seaport, Chon Buri province. In case of sweet tamarind, like longan process, they are collected by local collectors and send them to the tamarind factory. The fresh tamarind are graded and steamed in order to disinfect and inhibit the potential growth of weevil and fungus in tamarind pod. These are packed in small paper box weight 250g and 500g. These 40 small boxes are packed again in the big carton. The reefer containers truck

Bang Seaport, Chon Buri. The longan and tamarind must export declare at Lam Chabang Port Customs Bureau before moving these containers in the container vessel. The exporters usually use the ship agent and freight forwarder for transportation service. The time by vessel from Lam Cha Bang Seaport to Chennai Seaport is around 8 - 10 days. In case of other fruits such as rambutan, manosteen, quava and dragon fruit, due to the small volume of export by shipment or consignment, the fruit collectors gather fresh fruits from farmers and then grade, pack and send them to Talaadthai market, the biggest wholesale agricultural market, in Pathum Thani province located in the central region of Thailand. The exporters select and buy them from this market and then repack them in small plastic of foam tray and wrap with plastic. This packaging is ready to sell at destination market such as supermarket, hypermarket or department store in many major cities in India. Because these fruit are fragile and perishable, these are packed in foam box and put some cool gel packs in order to keep freshness under low temperature. These fruits are transported to India by air freight from Suvarnabhumi International Airport via air freight forwarder, and Thai Airway and Air India. These fruits must be declared at Suvarnabhumi Airport Cargo Clearance Customs Bureau before moving these containers to the airplane. The duration from Suvarnabhumi International Airport to major city of India depend on distance, namely 4.30 hours to Indira Gandhi International Airport (New Delhi), 4.30 hours to Chhatrapati Shivaji International Airport (Mumbai), 3.20 hours to Chennai International Airport (Chennai). From Suvarnabhumi International Airport, Thai Airways

provides 19, 7, and 7 flights a week to New Delhi, Mumbai, and Chennai, respectively, while Air India has 7, 7, and 14 flights.

In India, when Thai fruits arrive to airport and seaport, Indian importers often use shipping companies for custom clearance and move them from the port to warehouse. The result from field study at Mumbai, New Delhi and Chennai, we found that all kind of Thai exotic fruit are sold by wholesalers in wholesale market of each major city such as the APMC fruit market of Mumbai, Azadpur fruit & vegetable market of New Delhi, and Anna fruit market of Chennai. The retailers and fruit merchants from neighbouring city buy these Thai fruits from this wholesale market and transport them to their city. Because longan and sweet tamarind are imported in large quantity by ship, most of Thai fruits sole in fruit shop of this wholesale market are longan and sweet tamarind. The other Thai exotic fruit such as rambutan, mangosteen and rose apple, guava, dragon fruit, orange are sold in the high-end supermarket such as Foodhall under the Futures Group. Based on interviews from managers of Foodhall revealed that the best seller of Thai exotic fruit is a guava followed by sweet tamarind, longan, rambutan and mangosteen, respectively. In addition, based on the interviews from wholesalers in APMC fruit market at Navi Mumbai (Mumbai) and retailers in Crawford Market conclude that Indian prefer Thai fruit and the high seasons of Thai fruit are in the period of Diwali and Navaratri festival.



**Figure 4.** Export Fruits from Thailand to India by Thai Airway

The major threats of export Thai fruit to India are as follow: Firstly, the limitation of space and cost of air transportation, the air freight from Thailand to India is only Thai Airway and Air India, and each flight can transport only 500 kg. Therefore, the transportation cost is very high and exporters usually export many kinds of fruit in each flight. Secondly, the domestic distribution systems and logistics in India are in the process of developing particularly the highway route that connects between cities. Third, the fruit shipment by merchant vessel spends

a lot of time on the sea than air and land transportation. There is also the risk of fruit are easily damaged. Such rick could result in transaction costs in the supply chain [18]. Fourth, Thai exporters do not usually trade with the Indian importers because in the past the trade contracts were breached by both countries in different supply chain tiers [19].

The opportunities of Thai fruits in India are as follow. Firstly, under the total import statistics of fresh fruits from Thailand to India indicates positive trend in the future particularly tropical fruit that cannot be grown or produced on a commercial scale such as sweet tamarind, longan, rambutan and guava. Second, Thai fruits in India are very popular because of their high quality. Third, in case of longan that Indian call Thai-lychee, this implies that Indians are misunderstand about the correct name of longan and reflects that longan is in the stage of product introduction. Therefore, Indian importers or supplier must offer the product description by market promotion in order to communicate the information such as the correct name of longan, how to eat and the benefit of longan to the consumer. Fourth, under Thailand – India free trade agreement that the import duty of Thai tropical fruit equal zero and have more kinds of fruit than ASEAN – India free trade agreement. Thailand has comparative advantage in some fruits such as guava, mango, fresh grape and apple, when compare to other country members in ASEAN.



**Figure 5.** Thai Fruits sold in Foodhall

To raise the awareness of Thai fruits in Indian market, the MICE activities (meetings, incentive travels, conventions,

exhibitions) could be the mechanism for the business. Offering meeting and incentive trips for Thai exporters to India or Indian importers to have a meeting and incentive trip in Thailand, business could have an inspection at the farms and factory. Also bidding for international conventions about fruits in Thailand could raise awareness of Thai fruit. Trade shows and exhibitions of Thai fruits in the main city in India will also help promoting Thai fruits in India.

Finally, because the average income level of the Indian population is rapidly increasing particularly middle-income household and the changing of consumer behavior, make the more chance for high quality Thai fruits

## 5. CONCLUSION

The objectives of this paper are to investigate business opportunities and threats in logistics and supply chain management of Thai fruits in India market. Supply Chain Analysis (SCA) framework is used to analyse the business opportunities and logistics management in India market in schemes run by the modern trade to assist smallholders with production and marketing. The patterns of logistics and supply chain management found in this study are substantiated and linked with the existing modern trade scheme to see whether there are inconsistencies in the policies and actual implementations. This presents threats as well as opportunities for smallholders in Thailand. The standard set by buyers requires farmers to adjust their production and marketing systems. Assistance for farmers are derived from modern trade and government and collaborations amongst these two parties.

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