

Demand-Driven Supply Chain: The Case of Thai Fruit Export to China

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Abstract

This paper aims to study the market and supply chain of Thai fruits in China and propose a demand-driven strategy in the context of the COVID-19 pandemic. Data from interviews with more than 100 units in field trips and focused groups covers 20 provinces in Thailand and 12 provinces in China. Qualitative data analysis is applied through open coding, axial coding, and selective coding with the NVivo software. The contributions are 1) It proposes “Supply Chain Integration” (SCI) as the key strategy to achieve a “Demand-Driven Supply Chain” (DDSC), and defines the concept of SCI in a 5i framework (information, Initiation, interconnection, inspection, and investment); 2) It estimates the market size of Thai fruits in China and portrays 21 new consumer behaviors in 3 segments; 3) It describes components, process, and mechanism of the supply chain; 4) It analyses the current issues of impacts and solutions to the problems of ZCP (Zero COVID Policy) in China; and 5) For policy implication, it sets up six strategic objectives from the SWOT matrix, supported by related strategies in supply chain components and a guide to the competitive marketing mix.

Keywords: Demand-Driven Supply Chain, Supply Chain Integration, Fruit Export, Thailand, China

Introduction

Despite COVID 19, the fruit import in China increased by 31% to \$13.5 billion in 2021, with the top five source countries as Thailand, Chile, Vietnam, the Philippines, and New Zealand (Zang, 2022). China continues to be the largest market for Thai fruits. But 2021 is a roller coaster year for Thai fruit exporters: a good first half-year, but the price and export volume dropped significantly in the second half-year. What is the future for 2022 and beyond, when the Covid 19 virus hits us with incessant new variants from Omicron to Deltacron, and the ZCP (Zero COVID Policy) of China causes turmoil in logistics? China’s per capita GDP surpassed \$12500 in 2021 (CEIC, 2021). The Chinese importers extend their supplier chain from farm to retail chain stores, with the channels deepened to rural areas and third/fourth-tier cities. More fruits from our ASEAN neighbors are encroaching on the permission list and kitchen tables of China. Would Thai fruits sustain their growth and reach

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their potential? How would Thai stakeholders embrace the opportunities and address the challenges? This paper attempts to answer these questions in the following sections: 1) Market of Thai Fruits in China; 2) Supply Chain of Thai Fruit in China; 3) The Demand Driven Strategy and its implementation, and 4) Policy implications.



The method of “Desktop Research”; “In-depth/Focused Group Interview” and “Field Observation” is used in data collection. In Thailand, the interviews and field trips were conducted in 20 provinces involving 87 units (mostly on-site) from December 2019 to June 2021. They covered 7 groups of stakeholders from farmers to exporters etc. and 13 kinds of fruits. In China, the interviews were conducted in January 2022, covering 12 provincial units, mostly importers, whole-sellers, and retailers with national or regional markets in North West, North East, South West, East, and Central part of China. The interview notes, research papers, and news items are managed with the NVivo software for qualitative analysis. Five core categories are chosen (e.g., stage of the supply chain, key competitors in the Chinese market) in the final stage of selective coding.

1. The Market for Thai Fruits in China

1.1 The Permission List

Thailand has abundant resources of tropical fruits. The government has assigned GI (Geographic Indication) to 21 distinguished fruits with 62 cultivars in 25 provinces (Department of Intellectual Property, 2022). However, there are only 22 fruits permitted by the General Administration of Customs of PRC (GACC) (Thanmanee, 2022) to enter its territory (Table 1).

Table 1 The Permission List of Thai Fruits in China

No.	Name	Chinese	Thai	Picture	No.	Name	Chinese	Thai	Illustration
1	Banana	香蕉	กล้วย		12	Orange	橙	ส้ม	
2	Carambola	杨桃	มะเฟือง		13	Papaya	番木瓜	มะละกอ	
3	Coconut	椰子	มะพร้าว		14	Passion fruit	西番莲(百香果)	เสาวรส	
4	Durian	榴莲	ทุเรียน		15	Pineapple	菠萝	สับปะรด	
5	Guava	番石榴	ฝรั่ง		16	Pomelo	柚	ส้มโอ	
6	Jackfruit	菠萝蜜	ขนุน		17	Rambutan	红毛丹	เงาะ	
7	Lychee	荔枝	ลิ้นจี่		18	Rose apple	莲雾	ชมพูสด	
8	Long kong	椰色果	ลองกอง		19	Sapodilla	人心果	ละมุด	
9	Longan	龙眼	ลำไย		20	Sugar apple	番荔枝	น้อยหน่า	
10	Mango	芒果	มะม่วง		21	Tamarind	罗望子	มะขาม	
11	Mangosteen	山竹	มังคุด		22	Tangerine	柑橘	ส้มจีน	

1.2 Heavy Weight & Rising Star

Of these 22 fruits in the permission list, Durian Longan and Mangosteen are the top 3, they are the heavyweights, accounting for 95% of the value of Thai fruit exported to China in 2021 (Table 2). Mango, Young Coconut, and Pomelo, on the other hand, are the rising stars. Because Mango has growth potential compared with other Thai fruits, Young Coconut and Pomelo saw rapid growth in the past years (Table 3). These 6 fruits constitute 99.4% of the value of Thai fruit exported to China in 2021, and China is also the dominant market in volume for Durian (72%), Mangosteen (90%), Longan (75%), Young Coconut (87%), and Pomelo (82%). This paper focuses on these 6 fruits in the texts below.

Table 2 Heavy Weights: Export Value of Durian Longan and Mangosteen in China

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021			
		Mil B	Δ%	V Rank	Mil B	Δ%	V Rank	Mil B	Δ%	V Rank	Mil B	Δ%	V Rank	share%
ทุเรียน	Durian	13,179	79.4	1	26,341	99.9	1	47,798	81.5	1	98,332	105.7	1	70.6
ลำไย	Longan	4,406	-16.1	2	9,696	120	3	12,661	31	2	18,024	42	2	12.9
มังคุด	Mangosteen	3,261	62.1	3	11,752	260.4	2	11,576	-1.5	3	15,966	37.9	3	11.5
	Heavy Weight													95.0
	Total	23,816			51,289			75,899			139,203			100.0

Source: Custom of Thailand

Table 3 Rising Stars: Growth of Export Volume of Mango, Young Coconut, and Pomelo in China

รายการผลไม้ 14	Fruits 14	2018			2019			2020			2021		
		Ton	Δ%	Rank	Ton	Δ%	Rank	Ton	Δ%	Rank	Ton	Δ%	Rank
มะพร้าวอ่อน	Coconut Y	54,063	47.2	6	96,700	78.9	5	122,689	26.9	1	226,621	84.7	4
มะม่วง	Mango	8,914	87.0	3	12,024	34.9	6	10,028	-16.6	6	4,941	-50.7	14
ส้มโอ	Pomelo	9,795	3.8	9	7,075	-27.8	11	7,533	6.5	4	25,153	233.9	2

Source: Custom of Thailand

1.3 Market and New Consumer Behavior

The customers of Thai fruits are estimated to comprise half of the middle-class according to the definition of NSB (National Statistical Bureau) of China: A typical family of 3 persons with annual disposable income between ¥100,000 to ¥500,000, which covers about 200 million people (15% of the population) and 70 million families. Table 4 segments these customers into 3 groups (New Entry, Frequent User, and Connoisseur), with their income range, estimated size, typical behavior, and marketing focus. Table 5 describes the new behavior of these fruit customers driven by higher income, online and offline shopping, health concern, and social demography.

Table 4 Market Size and Segments of Chinese Consumers for Thai Fruits

Segment	Family Income ¥/Year	Estimated Size mil	Typical Behaviour	Marketing Implications
New Entry	55,000-160,000	108	Start trial of Thai fruits following words of mouth recommendation, or after experiencing Thai fruits in oversea travel	Wider & deep reach of channels Create awareness and exposure especially in offline point of sales. Nurture their consumption habits
Frequent User	160,001-345,000	71	Purchase at least 2 times per month during the fruit season Demand for convenience Shop for value: comparison competing brands.	Manage competition in value Packaging and delivery speed Content management & user involvement to provide sufficient information
Connoisseur	>345,001	20	Happy to pay a premium for quality & safety Look for speciality, exoticness and authenticity Higher-end shopping mall and specialized online store	Manage quality, Marketing message New variety, GI Certificate and brands in developed markets.

Source: Author

Table 5 New Consumer Behavior for Thai Fruits

Driver		New Consumer Behaviour	Marketing Implication
Higher Income	1	Broader perspective and more choices	Manage competition
	2	Buy larger quantity	Capture bigger market
	3	Buy higher quality	Manage quality, Marketing message
	4	Demand for convenience	Packaging and delivery speed
	5	Demand for service	Onsite/online service, after sale service
	6	Exotic & authentic	New variety, GI
	7	Self realization & emotion	Brand story & social value
Online & Offline Shopping	8	Easy access	Wider & deep reach of channels
	9	Substitute of oversea trip	Capture bigger market
	10	Bigger role of tech savvy young people	Technology & message for young people
	11	Embrace celebrity	Social media promotion
	12	Produce and search for information	Content management & user involvement
	13	Shrewd buyer	Value
	14	Group buying in community	Utilizing the new channels
	15	Longing for Acceptance in social network	Opinion leader in the target circle
Health Concern	16	Nutrition & function	Product development & promotion message
	17	Organic & safety	Certificate & traceability
	18	Low sugar	Low sugar contents in processed fruits
Social Demography	19	Light meal	Freshly squeezed juice & frozen fruit flesh
	20	Nuclear family	Small portion of fruits for small family
	21	Aging society	Health functions for aged people

Source: Author

2. Supply Chain of Thai Fruit in China

The supply chain of Thai fruits in China may be presented in 11 components from “R&D”, “Input for Production”, “Farming”, “Collection”, “Processing”, “Export”, “Cross Border Logistics”, “Import”, “Wholesale”, “Retail” to “Consumption” (Table 6); supplemented by the roles of Thai government from “Regulation”, “Extension”, “Promotion” to “Negotiation” (Table 7), and those of Chinese government from “Regulation”, “Taxation”, “Facilitation” to “Negotiation” (Table 8). Their mechanisms are described in terms of “What” (function), “Who” (player), and “How” (process) in each Table.

Table 6 Components and Mechanisms of Supply Chain

	R&D	Input for Production	Farming
What	Breeding program for disease tolerant cultivars with good quality and high yield Research on production and management for high quality and stable yield	Planting Materials, Fertilizer, Pesticide, Hormone; Equipment & Tools (including automation & digital equipment)	Planting plan, Water & Soil management, Pre-harvest field management, Harvest and post-harvest handlings
Who	Horticultural Research Institute (HRI) and Provincial Agricultural R&D Centers under Department of Agriculture (DOA , MOAC). ARDA, TRF, NSTDA, TISTR, Universities, Private companies, and Farmers Learning Centres in every district under Department of Agricultural Extension (DOAE)	Commercial nurseries & Learning Centers Community Enterprise, Cooperatives, Land Collectives; Sellers of agricultural machinery & equipments; Developers of IT applications	Small farmers organized in Community Enterprise (วิสาหกิจชุมชน), Cooperatives (สหกรณ์) and land collectives (แปลงใหญ่) New generation of Smart Farmers Farms controlled by collectors & exporters
How	Research with government & private funding Farmers develop own cultivars & practices R&D and learning centers promote new varieties and transfer new technology	Farmers keep and develop seed, sprout or grafting stock; Community Enterprise, Cooperatives, Land Collectives buying at bulk price and resell to its members; Government provide seed/sprout to promote new varieties Government subsidy for buying large agricultural equipment; IT applications adopted for production & marketing	Forming planting plan and producing in response to price signal Regulated and supported by government

Table 6 Components and Mechanisms of Supply Chain (Cont.)

	Retail	Consumption
What	Deal with consumers directly	Final demand for imported Thai fruits at the last end of the supply chain. In some cases they are also “prosumers”, providing opinions which may influence the operations of the upper stream
Who	Registered firms or individual	Any people who utilize imported Thai fruits as part of their diet
How	High end to middle level supermarket New retail establishment which merges online ordering, onsite experiencing and speed delivery Large national fruit store chain in franchise Community and road side fruit shops Small sellers in e-commerce platform Bars or F&B establishments selling fruit juice, fruit snack, and other processed fruits	Make purchase decision based on need and in response to the marketing mix of the retailers. Share their experience and opinions in various social media groups such as WeChat and Zhihu

	Collection	Processing	Export
What	Collecting fruits from individual orchards And deliver to processors or exporters	Simple Processing (such as trimming or polishing coconut, or frozen durian) or deep processing (such as Coconut pudding, Durian paste or preserved Tamarind)	Buying in Thailand and selling in China Participate in forming price in the market
Who	Local collectors with permanent establishment such as cold storage; Seasonal collectors coming during the harvest time; Farmer organizations such as community enterprise Processors and exporters/importers themselves	Fruit processing factories Collector	Many are the Chinese importers themselves using Thai nominees Some are Thai collectors or processors Farmers or farmer organization
How	Collectors collect fruits, separate fruits according to grades with simple packaging; Deliver them to processors or exporters	Collectors or factories transform fruits for easy consumption, longer preserving period or meeting the demand of consumers for better taste or nutrition function	Registered exporters buying from collectors or processors and selling to Chinese importers; Direct export by farmers or farmer organizations

	Cross Border Logistics	Import	Wholesale
What	Deliver the exported fruits from Thailand to major ports of China	Act as an intermediary between the buyers in China and the sellers in Thailand	Sale in bulk to a retailer other than a standard consumer
Who	Thai or Chinese Shipping companies	Licensed Chinese firms as importer in general trade Cross border operator in cross border trade	Registered Chinese firms
How	By land (4 routes: R3a, R9, R12, Nakhon Phanom-Dongxing) By rail Through Pingxiang and Mohen By sea or air Through designated ports for fruit import	Make and execute purchasing decision based on assessment of market information, influence the upper stream through order and feedback. Customs clearance	Buy from importer and distribute to retailers In offline whole sale market Or online for national or regional market In many cases, the whole salers would also provide logistics service

Source: Author

Table 7 Roles of Thai Government in Supply Chain

	Regulation	Extension
What	Standard & certificate to improve productivity, efficiency and quality. Reduce unnecessarily use of pesticide and other chemicals Quality Control	Strengthen capacity of farmers, farmer families, farmer organizations such as community enterprises in production according to the market needs, to transfer appropriate agricultural technologies and to give agricultural services
Who	National Bureau of Agricultural Commodity Food Standards (ACFS) Under MOAC Department of Agriculture (DOA) Department of Agricultural Economics (DOAE) In MOAC	Department of Agricultural Extension (DOAE) provincial & district office
How	ACFS sets up & publishes Thai Agricultural Standard (TAS) DOA inspects & certifies GAP/GMP, PC/HC & Exporter Registration DOAE issue the harvest date of Durian	Through extension programs for Land collectives, Community enterprise, Cooperatives, Young smart farmers, Offsprings of farmers, Agricultural Labors, and Learning Centers

Table 7 Roles of Thai Government in Supply Chain (Cont.)

	Promotion	Negotiation
What	Business matching, building awareness of Thai fruits and promotion in online and offline channel GI (Geographic Identification) for marketing advantage	FTA with China Fruit market access and Sanitary and Phytosanitary (SPS) requirement
Who	Department of International Trade Promotion (DITP, MOC) for the marketing part under the coordination of the Fruit Board Department of Intellectual Property (DIP, MOC) for GI Department of Internal Trade (DIT, MOC)	Department for Trade Negotiation (DTN, MOC) National Bureau of Agricultural Commodity Food Standards (ACFS) Under MOAC
How	DITP conducts Online Business Matching Thai fruit exhibitions in China Flagship shop in Tmall, Activities in Modern Trade DIP certifies fruits with GI Farmers & traders in the geographic location may register for GI valid for 2 years DIT sets up Farm Outlet for domestic trade	DTN negotiates on FTA Agreement ACFS negotiates with GACC (General Administration of Customs China) on market access and SPS requirement leading to related protocols

Source: Author

Table 8 Roles of the Chinese Government in Supply Chain

	Regulation	Taxation
What	Market access and SPS requirement	Tariff & VAT
Who	GACC and SAMR	GACC (General Administration of Customs China)
How	Market Access: The permission list for fruits import Registered orchard & packing house with GAP or GMP Designated port for fruit import (123 July 2021)	Customs Duty: 0% for Fruits from ASEAN Under the CAFTA VAT for Imported Fruit: 13%, 2017: 11%, 2018: 10%, 2019: 9% VAT = (CIF+Tariff) x VAT rate VAT for cross border e-commerce 70% of VAT of General Trade

	Facilitation	Negotiation
What	Promote & facilitate fruit import	FTA with Thailand & ASEAN Fruit market access and Sanitary and Phytosanitary (SPS) requirement
Who	Trade Development Bureau, MOC China Council for the Promotion of International Trade, (CCPIT) and its local branches China International Import Expo Bureau China Foreign Trade Center	MOC (Ministry of Commerce) & SAMR (State Administration for Market Regulation) for FTA GACC (General Administration of Customs China) For market access and SPS requirement
How	Promotion activities in cooperation with DITP, MOC Thailand China International Import Expo China Import and Export Fair	MOC negotiates on FTA Agreement with DTN (Department of Trade Negotiation) under MOC of Thailand SAMR for signing and execution of FTA GACC negotiates with ACFS (National Bureau of Agricultural Commodity Food Standards (ACFS) under MOAC of Thailand on market access and SPS requirement leading to related protocols

Source: Author

3. The Demand-Driven Strategy

3.1 Demand-Driven Supply Chain & Supply Chain Integration

The demand-driven Supply Chain (DDSC) has attracted increasing attention in the recent literature (Chartered Institute of Procurement & Supply, 2019; Chi, Huang, & George, 2020; Sharma, 2019). It aims to build supply chains in response to demand signals, with mechanisms of “Demand Detection”, “Anticipation”, “Communication”, “Adaptions & Collaboration”, emphasizing “Alignment” (share vision), “Agility” (respond to change), and “Adaptability” (adjust structure) (Pointe, 2018; KPMG, 2016).

The ideal of a Demand-Driven Supply Chain (DDSC) could be realized through Supply Chain Integration (SCI) driven by emerging leaders of importers or retailers (from both Thailand and China) which have expanded to almost every component of the supply chain, from farming to retailing and customer service.

Their roles in SCI can be summarized in 5i, enhanced in the context of digital transformation as follows:

- Information: Quick feedback from consumer demand;
- Initiation: Trigger reactions in response or in advance to the changing demand with a network of SMEs, research units, and farms;
- Interconnection: Coordinate among different units along the supply chain;
- Inspection: Establish and implement the higher standard with a trace back system;
- Investment: Bring in financial, technological, and human resources by leveraging their economy of scale.

This strategy of embracing SCI driven by emerging leaders of importers or retailers, however, should be complemented by active government regulations to protect the interests of Thai farmers and SMEs, and make sure the Thai and Chinese stakeholders abide by laws and get their fair shares of benefits.

3.2 Digital Transformation (DT)

The Supply Chain Integration (SCI) is also made possible in the context of digital technology on the transformation of the supply chain of Thai fruits in China is summarized in Table 9, in terms of 1) Big Data, AI, and Analytics, 2) IoT and Automation, and 3) Mobile Communication and Social Media.

Table 9 Context of Digital Transformation

Big Data AI & Analytics	Gene selection & modification for better cultivars Risk management such as weather prediction and pest/disease control Demand prediction & inventory optimization CRM & individualized recommendation Smart government for policy making and execution
IoT & Automation	Management of temperature, moisture, and chemicals in the field Locate and adjust conditions of containers in transportation Shelf management in retail stores Drone & robots in field management, processing & transportation
Mobile Communication & Social Media	Shop any time and any place Consumers with product knowledge & trace back ability Producers' access to technology and real time market information

3.3 Meet the Challenge of ZCP

Supply Chain Integration (SCI) is also one of the solutions to meet the challenge of ZCP. China is still in the middle of the struggle against COVID-19 and there is still no sign of relaxing its ZCP at this moment, Thailand must meet the challenges of “Logistic Breakdown” and “Fruit Contamination” with the instruments of “International Negotiation” and “Domestic Management” (Thaigov, 2022).

For the issues about “Logistic Breakdown”, the focus of international negotiation could be:

- Possible deal for receiving Thai Fruit through Lao-China railway directly in Kunming.

- Possible deal for speeding up the Customs procedure with a green channel for Thai fruits with GMP plus or CFC (COVID Free Certificate).

The focus of domestic management could be:

- Infrastructure (new bridge, warehouse) for expanding the capacity for utilizing the Lao-China railway. For the issue of “Fruit Contamination”.

The focus of international negotiation could be:

- The commitment of China to reject only the fruits from specific packing houses or truck companies related to the contamination, instead of an all-out lockdown of the port for Thai fruits.

- A clear mutual understanding about what constitutes a COVID-19 contamination of fruit and the disinfection requirement.

The focus of domestic management could be:

- Incorporate the procedure disinfection against COVID-19 virus into the GMP plus certification and issue reliable CFCs (COVID Free Certificate).

4. Policy Implications

Six strategic objectives are derived from the SWOT matrix (Table 10). The critical issues for achieving these objectives are: 1) Supply Chain Integration (SCI) and related strategies of supply chain components; 2) Digital Transformation (DT); 3) Competitive Marketing Mix (CS and MM); and 4) Meet the challenge of ZCP (CZ).

Table 10 SWOT Matrix and Strategic Objectives

SWOT Matrix Of Thai Fruits	Strength S1: Abundant resources of fruit and R&D capabilities for new varieties S2: Established reputation, scale & channels S3: Government direction, regulation, extension, promotion & negotiation S4: Entrepreneurial farmers and other stakeholders	Weakness W1: Stable and high quality supply W2: Understanding of Chinese market W3: Innovation in processing and packaging W4: Efficient system for fruit collection and distribution
Opportunity O1: Changing need and behavior of Chinese customers O2: Emerging integration of supply chain in Thailand & China O3: New logistic capability by air and train via Laos O4: Digital technology in production and marketing	SO Strategies: $(S1+S3+S4)+O1=Ob1$: R&D and Innovation $(S3+S4)+(O2+O4)=Ob2$ Embrace Supply Chain Integration $(S3+S4)+O3=Ob3$ Manage External Shock	WO Strategies: $(O2+O4)-(W1+W2+W3+W4)=Ob7$ Leverage Digital Transformation
Threat T1: Shocks of Covid 19 impacting market demand, cost, logistic, and labor supply T2: Lack of sustainability due to oversupply and price fluctuation T3: Competition from neighboring ASEAN suppliers T4: Malign practice in production & collection undermining the quality & reputation	ST Strategies: $(S3+S4)-T1=Ob3$ Manage External Shock $(S3+S4)-T2=Ob4$ Maintain Sustainability $(S1+S2+S3+S4)-T3=Ob5$ Enhance Competitive Advantage $S3-T4=Ob6$ Protect Stakeholders	WT Strategies: $T1+(W1+W2+W3+W4)=Ob3$ Manage External Shock $T2+(W1+W2+W3+W4)=Ob4$ Maintain Sustainability $T3+(W1+W2+W3+W4)=Ob5$ Enhance Competitive Advantage

The sub-strategies of each component of the supply chain (SC1 to SC11), and the roles of the Thai governments (GT1 to GT5) are listed in Table 11.

Table 11 Sub-Strategies for Supply Chain Components (SC) and Roles of Thai Government (GT)

Components	Strategy
R&D (SC1)	Develop disease tolerant cultivars with good quality and high yield in response to the market demand; promote good practices of field management, processing technology, packaging; follow up the adoption process; with digital technology; strive for sustainability and competitiveness.
Input for Production (SC2)	Introduce high quality planting materials (e.g. seed, sprout or grafting stock) of new cultivars in response to the market demand; distribute fertilizer, pesticide, hormone with minimal environment and health hazard; introduce and adapt to the local condition the digital equipments for automation and mobile application for technical knowledge and market information; strive for sustainability and competitiveness.
Farming (SC3)	Adopt new cultivars in response to the market demand; participate in R&D and innovation; apply technologies, especially digital technologies and best practice in capacity planning, water & soil management, pre-harvest field management, harvest and post-harvest practices; with minimal environment and health hazard; follow TAS and GAP; achieve economy of scale through "Cooperatives" and "Land Collectives"; manage external shock with market forecast and government guidance, strive for sustainability and competitiveness
Collection (SC4)	Collect in response to the market demand; promote GMP to be a Registered Packing House for exporting to China; adopt "GMP plus" or "Covid Free Certificate" (CFC) to comply with the Zero Covid Policy (ZCP) in China; maintain the quality standard by government or importers; promote the trace back system; share market information with digital technology; strive for sustainability and competitiveness.
Processing (SC5)	Transform fruits for easy consumption, longer preserving period, better taste or nutrition function in response to the market demand; digest the over supply of raw fruits due to season or external shock; participate in R&D and innovation; apply technologies, especially digital technologies (e.g. for quality control and process automation) and best practice; promote GMP; maintain the quality and safety standard by government or importers; strive for sustainability and competitiveness.
Export SC6	Develop professional exporters, embrace supply chain integration with closer upstream downstream links; in response to the market demand; brand building; maintain the quality standard by government or importers; promote the trace back system; share market information with digital technology; manage external shock with diversification; law & regulation to protect both Thai and Chinese stake holders; strive for sustainability and competitiveness.
Cross Border Logistics SC7	Mitigate the traffic congestion due to the ZCP by using all modes of transportation (land, rail, sea and air), through all possible routes and designated ports; utilize fully the Laos-China railway with proper infrastructure and Customs facility; extend cold storage capability; apply digital technology to monitor and share the cargo information; reach the inland area of China; raise the speed of delivery for freshness and reduce waste, strive for sustainability and competitiveness.
Import SC8	Product selection and development in response to the market demand; expand cross border trade, embrace supply chain integration with closer upstream downstream links; promote the trace back system; share market information with digital technology; build up more trust & cooperation with the Thai government and local partners; comply with ZCP; strive for sustainability and competitiveness.
Wholesale SC9	Efficient distribution and storage service to retailers; embrace supply chain integration with closer upstream downstream links; promote the trace back system; share market information with digital technology; raise the speed of delivery for freshness and reduce waste,; strive for sustainability and competitiveness.
Retail SC10	Deliver satisfactory consumer experience through online and offline contact points and CRM programs; Enhance the awareness and reputation of Thai fruits; embrace supply chain integration with closer upstream links; brand building; set up and maintain standard for quality & food safety; promote the trace back system; share market information, predict sales volume and manage inventory & shelf display with digital technology; strive for sustainability and competitiveness.
Consumption SC11	Discover, communicate and fulfill customer need, participate in R&D and innovation with new product ideas; develop marketing contents from the feedback with digital technology like social media; consumer right protection with quality and food safety, information from trace back system; strive for sustainability and competitiveness.
Direction GT1	Set up and implement national fruit strategy, coordinate MOAC (for production) and MOC (for marketing) by the Fruit Board; promote R&D and Innovation; embrace supply chain integration; manage external shock such as Covid 19, maintain sustainability in demand and supply; enhance competitive advantage; protect stakeholders; and leverage digital technology.
Regulation GT2	Set up standard (e.g. TAS) & issue certificate (e.g. GAP and GMP) to improve productivity, efficiency and quality; ensure Thai fruits meet the SPS requirements of international standard and importing countries with minimal environment and health hazard; manage external shock such as Covid 19; embrace supply chain integration; enact and enforce rules to protect all stakeholders with digital technology; strive for sustainability and competitiveness.
Extension GT3	Promote R&D and Innovation; extend the strength of farmers and enterprises with planning for optimal size, higher efficiency and quality; in response to the market demand; system to manage external shock (e.g. storage, deep processing, insurance, diversification); embrace supply chain integration; provide technology advice through farmer organizations such as local "learning center" and "community enterprise", with digital technology such as mobile apps; strive for sustainability and competitiveness.
Promotion GT4	Build up and enhance awareness and reputation of Thai fruits, expand fruits and areas with GI (Geographic Identification); promote sales online and offline in cooperation with local governments, importers & retailers; through business matching, Thai fruit exhibitions, flagship shop in Tmall, in store activities; embrace supply chain integration, manage external shock with extra marketing efforts; apply digital technology such as social media; strive for sustainability and competitiveness.
Negotiation GT5	Negotiates with GACC (General Administration of Customs China) on market access and SPS requirement; expand the permission list of Thai fruits; update and implement the Protocol on land transportation through third country; urgent action to mitigate traffic congestion due to the ZCP by fully utilizing the Laos-China railway and speeding up the Customs procedure; Coordinate with Laos and Vietnam for cross border land transportation; strive for sustainability and competitiveness.

References

- CEIC. (2021). *China GDP Per Capita*. Retrieved January 10, 2022, from <https://shorturl.asia/9HCJW>
- Chartered Institute of Procurement and Supply. (2019). *Demand-Driven Supply Chain*. Retrieved January 10, 2022, from <https://shorturl.asia/9HCJW>
- Chi, M., Huang, R., & George J. F. (2020). *Collaboration in the Demand-Driven Supply Chain: Based on a Perspective of Governance and IT-Business Strategic Alignment*. Retrieved January 10, 2022, from <https://shorturl.asia/Ile9o>
- Department of International Trade Promotion, Ministry of Commerce Thailand. (2017). *International Trade Economic Situation Report Market Situation of imported fruit in China by the Overseas Trade Promotion Office in Xiamen City*. Retrieved January 10, 2022, from https://www.ditp.go.th/contents_attach/168157/168157.pdf
- Department of Intellectual Property. (2022). *GI Products in Each Region*. Retrieved January 20, 2022, from <https://www.ipthailand.go.th/th/gi-002.html>
- KPMG. (2016). *Demand-Driven Supply Chain 2.0 KPMG International*. Retrieved January 20, 2022, from <https://shorturl.asia/0IDLn>
- Pointe, M. (2018). *Five Key Factors to Creating a Demand-Driven Supply Chain*. Retrieved February 10, 2022, from <https://shorturl.asia/vpM3m>
- Sharma, V. (2019). *The Cloud-Based Demand-Driven Supply Chain*. Retrieved February 12, 2022, from <https://shorturl.asia/pTFxD>
- Thaigov. (2022). *Fruit Board Fears Coronavirus Outbreak in China Impact on Thai Fruit Exports, Recommends Exporters to Increase Shipping by 55%*. Retrieved February 12, 2022, from <https://www.thaigov.go.th/news/contents/details/53408>
- Thanmanee, P. (2022). *UPDATE! The Situation of Transportation of Agricultural and Food Products (Cold Chain Logistics) between Thailand and China*. Retrieved February 14, 2022, from <https://shorturl.asia/64CIy>
- Zang, J. (2022). *China's 2021 Fruit Import and Export Statistics Released*. Retrieved February 12, 2022, from <https://shorturl.asia/yzF0Z>