

A Case Study of Pana Coffee Company Limited on Coffee  
Production Analysis



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Pana Coffee Group is a Thai organic coffee manufacturer in Chiang Mai, the northern part of Thailand. Organic Sustainable Value Chain is what they adhere. They handle the organic supply chain from upstream to downstream. They grow seedlings to saplings. They plant the saplings at own lands where the altitude, temperature, and humidity suit well without using any chemical substances, for instance, herbicides, pesticides, and fertilizers. They harvest the coffee once the coffee fruits are ripe. They have the mill which is fully-equipped with cutting-edge and environmental friendly machines to produce organic coffee that is supreme in quality. They also maximize the benefits of raw material. The skin of coffee cherries can be another product for them to sell. The waste from parchment coffee skin can be the fertilizer using in own farms.

Apart from handle this whole supply chain themselves, Pana Coffee also formed up the member group of Project Shade Grower Group to expand their knowledge and know-how of organic coffee business to other Thai coffee growers who are interested in coffee organic farming. They constantly visit the members to update the knowledges and give a feedback on coffee quality. Pana Coffee wants to see the sustainability in environment and coffee industry. This will also help Pana Coffee in terms of lowering the risk of raw material shortage if they are not able to harvest coffee at the amount they target at. They will buy organic parchment coffee from the members of the group.

The objective of this individual study report is to study about the production process of Pana Coffee. The report looks into each process of production, starting from planting, harvesting, and processing. The analysis in each process is conducted by SWOT analysis to find strengths, weaknesses, opportunities, and threats in the production process. The recommendations are made for improvement of the coffee production from upstream to downstream by using TOWS matrix.

Field of Study:	Business and Managerial Economics	Student's Signature .....
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## **I. INTRODUCTION**

### **THAILAND'S COFFEE INDUSTRY OVERVIEW**

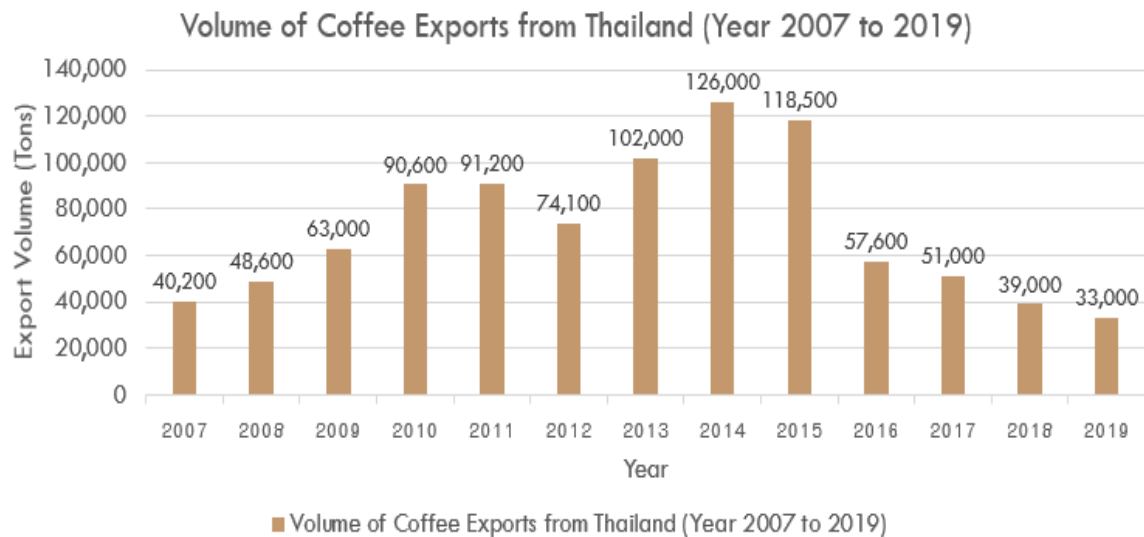
Thailand coffee farming industry is from the initiative of the late King Rama IX in 1974 when he visited the northern part of Thailand. He encouraged the villagers to do coffee plantation instead of growing opium fields and doing shifting cultivation. The late king had foreseen that Thai people would drink more coffee in the next 10 to 20 years. That would be a good opportunity for them to continue and expand their farming in the future.

“In 2020, Thailand is the 10<sup>th</sup> largest coffee bean exporters of the world. Total amount of export is 81,000 tons.” (Tejasen, 2020). According to Ministry of Commerce and Ministry of Agriculture and Cooperatives, Thailand's coffee market worth is 30,000 million baht. As the market is growing every year, Ministry of Agriculture and Cooperatives has a vision to position Thailand as one of the leading coffee producers and sellers in ASEAN region. They see the opportunity to turn coffee into a new cash crop for local growers and coffee-related business sector. The reason is that world premium-quality coffee bean price increases every year, as well as Thailand's coffee market value. At the present, Vietnam and Indonesia are ranked as the top coffee exporters of ASEAN respectively.

“Thailand's average coffee consumption is 1.2 kilograms per person per year, which is about 300 cups per person per year. However, the consumption of Thai is still below the global average, comparing with Europeans who consume 4 – 5 kilograms of coffee per person per year,” according to Tejasen's claim (Tejasen, 2020).

Thailand's coffee demand increases every year but the crop productivity are in down turn. The total area of coffee farming becomes smaller. The coffee farmers turn to grow other cash crops instead because the cultivation cost is cheaper and selling price is higher. Therefore, we export less coffee and import more coffee to meet the demand in country. According to Statista, “it showed that

volume of coffee exports from Thailand during 2007- 2019 is in decline per chart below” (Statista, 2019):



*Figure 1: Volume of Coffee Exports from Thailand (Year 2007 – 2019)*  
(Source: Adapted from <https://www.statista.com/>)

However, we still see the continued growth of coffee market domestically and internationally. The development in coffee bean types, coffee products and innovation is essential in terms of improving market value and crop yield. Moreover, specialty coffee is not something to overlook because the market price is very high up to 100,000 baht per kilogram, for instance, civet coffee beans. Hence, it is highly important to support local coffee growers in terms of technology, knowledge, and market insight if they literally wish to turn coffee in to the new cash crop of Thai economy.

## **COMPANY OVERVIEW**

Pana Coffee is an organic coffee manufacturer in the Northern region of Thailand. Pana Coffee plant was established in 2017 and the production line was ready for commercial run in 2018. They have a strong commitment in doing business with sustainability. “Organic Sustainable Value Chain was first implemented in Thailand by Pana Coffee” (The Coffeenery, 2020). It is

recognized as the most eco-friendly coffee business model in Asia. In terms of production, Organic Sustainable Value Chain starts from:

- How the raw material has been cultivated;
- How the raw material intake has been selected;
- How the production has been run;
- How the waste from production has been turned into a new product to sell

Pana Coffee owns 3 organic coffee farms in Chiang Mai which are:

- Tonkla Nursery: Growing seedlings into saplings;
- Doi Mek Farm: Growing saplings until harvest;
- Saked Dao Farm: Growing saplings until harvest

Apart from their own farms, they also encourage the local farmers to participate in organic coffee farming. However, it is not easy for them to promote this particular farming. Prior planting for Pana Coffee, the local farmers must be educated in organic cultivation. Their lands must be approved whether they are appropriate for organic farming or not as well. That becomes a challenge for Pana Coffee as the supply of organic coffee beans is limited.

There are 2 types of coffee that Pana Coffee has planted which are Arabica and Catimor. The seedlings and saplings of these Arabica and Catimor coffee are from Faculty of Agriculture, Chiang Mai University.

As sustainability is a key of business from seed to cup, Pana Coffee does not only wish to grow and improve Thai coffee market, but also to expand the knowledge from upstream to downstream and back to stakeholders.

Pana Coffee does not only do coffee farming and processing, but there is 'The Coffeenerly' under Pana Coffee as well. Mr. Peera Panasupon, a founder of Pana Coffee, has a vision to do coffee business with the concept of coffee education. The Coffeenerly is the coffee learning center, providing courses from upstream to downstream of coffee business, for example, coffee grading, barista, shop management, etc.

## **COFFEE TYPES OVERVIEW**

The major coffee types in this world are Arabica and Robusta. In this research, we particularly mention about 2 types of coffee that Pana Coffee is growing, which are Arabica and Catimor. The coffee origin is a genus plant called Coffea. It grows best in rich soil, mild temperature, frequent rain, and shaded sun.

Arabica coffee bean is from Coffea Arabica. It is originated from the original coffee tree in Ethiopia. It counts as 70% of world's coffee production is Arabica. What is popular about Arabica is its fine, mild, aromatic characteristics. The taste is smoother and sweeter. It also contains less caffeine. The appearance of Arabica coffee bean is flatter and longer than Robusta type. The world's coffee market value of Arabica coffee bean is the highest. Arabica's quality is better if the coffee trees are grown in the high altitude.

Catimor is a cross between Timor and Caturra Coffea. It has a part of Robusta's characteristics from Timor side. It is first originated in Portugal in 1959. The reasons why Catimor is popular among coffee growers in Southeast Asia are disease-resistant and high-yielding. The elevation and rainfall are also the factors for growing in this region. The taste is deep and complex.

## **OBJECTIVES**

In this study, it will focus on analyzing current production process of Pana Coffee in the following areas:

- Raw material cultivation and harvest
- Raw material intakes
- Mills process
- Waste management

After exploring production process in the mentioned areas, Pana Coffee's strengths, rooms for improvement, opportunities, and challenges of internal and external factors will be discussed.

## **I. PRODUCTION PROCESS**

### **COFFEE CULTIVATION**

#### ***ORGANIC DOES MATTER***

According to USDA Organic, it stated that “Organic is a labeling term that indicates that the food or other agricultural product has been produced and processed using approved methods. These methods integrate cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. Synthetic fertilizers, sewage sludge, irradiation, and genetic engineering may not be used (National Organic Program, 2016).”

In case of organic coffee, here the criteria of organic standards (National Organic Program, 2016):

- Land must have had no prohibited substances applied to it for at least 3 years before the harvest of an organic crop.
- Soil fertility and crop nutrients will be managed through tillage and cultivation practices, crop rotations, and cover crops, supplemented with animal and crop waste materials and allowed synthetic materials.
- Crop pests, weeds, and diseases will be controlled primarily through management practices including physical, mechanical, and biological controls. When these practices are not sufficient, a biological, botanical, or synthetic substance approved for use on the National List may be used.
- Operations must use organic seeds and other planting stock when available.
- The use of genetic engineering, ionizing radiation and sewage sludge is prohibited.

Organic is the key product and philosophy of Pana Coffee. They have acquired certifications from USDA Organic, European Union Organic, and OneCert International Organic Standards. It is mandatory for them to follow these mentioned organic standards. Apart from organic standards to follow, they believe the quality of coffee depends on the suitable environment. The right

altitude, sunlight, and rainfall are related to the quality of coffee. The soil fertility and the saplings quality are also important to grow the great quality coffee. This is to guarantee that Pana Coffee has taken organic and quality standards seriously to maintain their reputation, certifications, and standards in the organic coffee market.

### ***SEEDLINGS TO SAPLINGS***

Starting from growing seedlings into saplings, they own the nursery farm named Doi Luang Seedling Station, to grow seedlings into saplings. The seeding station is located at Chiang Dao. They cultivate the seedlings in the greenhouse under controlled condition to help them grow to be the strong saplings. This growing process is doing without pesticide and not directly exposing to sunlight. It takes about 1.5 years prior taking saplings to grow at the farms. Apart from growing saplings themselves, they partner up with Faculty of Agriculture, Chiang Mai University and obtain saplings from them to grow in their farms. The saplings they grow are Arabica and Catimor.

“There are 2 farms owned by Pana Coffee – Doi Mek and Saked Dao. Doi Mek Farm is the first farm, launched in 2011. It is located at the hillside of Chiang Dao at the altitude 1,000 – 1,400 meters above sea level. The annual average temperature is 21 Degrees Celsius. The land size is about 300 Rai. Saked Dao Farm is the second farm, launched a year after Doi Mek Farm. It is located at Doi Saket at the altitude 1,000 – 1,200 meters above sea level. The annual average temperature is 22 Degrees Celsius” (The Coffeenery, 2020). Aside from their own farms, Pana Coffee created Shade Grower Group to partner up with local coffee growers. These coffee farmers have to be interested in doing organic farming and be a member of the group. Pana Coffee will contact them to survey those lands, educate them on organic farming, and providing organic saplings. The grower group is not limited only in Chiang Mai, but also expands to Chiang Rai, Mae Hong Son, Lampang, and Tak.

Once the saplings are strong enough, they will be planted at farms. The cultivation process is done under shaded condition of the forest canopy. There is no synthetic chemical pesticide and fertilizer being used in the process. “The

reason to grow under shade is that coffee tends to ripe slower and taste more flavorful than exposing to direct sunlight” (The Coffeenery, 2020).

### ***HARVEST COFFEE***



*Figure 2: Image of Coffee Cherries*

It approximately takes 3 – 4 years for newly planted coffee tree to bear fruits. The fruit is called coffee cherry. It starts off as green coffee cherries and turning deep red when it is ripe. Once it is ripe, it is ready to be harvested. Generally, there is only 1 crop per year for coffee cherries. It is possible to have 2 crops per year, for example, Colombia. Typically, there is only 1 crop per year in Thailand. The major coffee cherries harvesting period occurs during October – March.

As they do organic coffee farming, the coffee cherries they can harvest from Doi Mek and Saked Dao is less than 100 tons per year. That is why they have to expand their network to other coffee growers as well. Otherwise, it is not possible to produce coffee products in a year. However, there is a limitation in buying fresh coffee cherries. The coffee cherries must be transported to the mill within 24 hours for processing. If not, they will ferment themselves and the quality will diminish. The coffee aroma will smell more fermented. Therefore, Pana Coffee only buys parchment coffee from the farmers who are the member of Shade Grower Group. The reason is they are certified to be organic coffee farming for Pana Coffee. The certified Q Arabica graders will step in to grade the coffee quality by doing coffee cupping. There is a score chart to grade which score will this parchment coffee will fall to. For coffee specialty grade, the score



must be higher than 80 points. If Q graders approve, Pana Coffee will buy it for their raw material.

## **WET MILL**

### ***FRESH COFFEE CHERRIES TO WET MILL***



*Figure 3: Image of Wet Mill*

Once the fresh coffee cherries are transported to Pana Coffee's mill, the Wet Mill is the first check point for the coffee cherries to stop by. There are many processes to be done at Wet Mill. The coffee cherries will be inspected the quality per following measurement:

- Cleanliness
- Pesticide Residue
- Ripeness uniformity
- Brix (Sugar Content)

### ***WASHING AND SEPARATING PROCESS***

Once the coffee cherries pass the inspection process, they will go through the washing and separating process. This process is highly important as it is a part of raw material sorting process to remove the lower grade of coffee cherries out. The process is done by using Pinhalense Mechanical Cyphonic System. The staff

will pour the coffee cherries into the tank where the water will help sorting out debris and under qualified coffee cherries. If any coffee cherry floats, it will be taken out as it may affect to the taste and quality as a whole. This is to get all the harvested coffee cherries ready for the next process.

### ***PULPING PROCESS***



*Figure 4: Image of Pulped Coffee Cherry*

After washing and separating process, here comes the pulping process by Pinhalense Eco-Super Pulper. It is not compulsory to pulp every coffee cherry. It depends on which coffee products you decide to produce. The coffee cherries will be loaded into the machine. The machine will gently remove the outer skin with minimal use of water in the process. Even though the outer skin is removed, the mucilage is still coated the coffee beans. The best quality of coffee beans is still remaining during this process.

### ***FERMENTATION PROCESS***

When the pulping process is done, the pulped coffee will be loaded into the stainless steel tanks where fermentation being done. The fermentation process here at Pana Coffee can be done either wet or dry. There are some optional additives to be added to flavoring the coffee such as yeast. The fermentation process takes about 3 days in the fermenting tank. Then, they are assigned to

different drying processes, depending on which coffee formula they would like to produce.

### ***DRYING PROCESS***



*Figure 5: Image of Drying House*

- ***Wet or Washed Process*** - It is a method where the pulped coffee is washed out the sticky mucilage by using mechanical mucilage remover and ferment it in the tank with water and optionally with additives such as yeast. It normally takes 3 days for fermentation to be done. The taste of coffee from wet process is tender and a bit acidic.
- ***Honey Process*** - The pulped coffee covering with mucilage are naturally dried at drying house. They will dry until the moisture content in coffee beans meet their standards. The honey process helps balancing and creating the splendid coffee taste. We can taste the sweetness and acidity from the coffee.
- ***Dry or Natural Process***: The fresh coffee cherries are naturally dried at drying house. The drying process is very slow because they are dried with skins. However, the slow drying process actually helps developing better coffee's flavor. It tastes more fruity, sweet, and full body. This method is the slowest way to dry parchment coffee. It takes almost 1 month to dry the coffee fruits.



*Figure 6: Image of Parchment Coffee*



*Figure 7: Image of Honey Process Coffee*



*Figure 8: Image of Dry Cherries*

What to be careful about Honey and Natural process is the heat. If it is over drying, it will affect the coffee quality, taste, and aroma. Hence, Pana Coffee team carefully monitor and control the temperature and humidity levels in the

drying houses to make sure that moisture content in coffee is at 11% or between the tolerant rate of +1 or -1 in order to preserve the quality of coffee.

## **DRY MILL**

### ***PARCHMENT COFFEE TO GREEN COFFEE BEANS***



*Figure 9: Image of Dry Mill*

Once the coffee cherries are processed to be parchment coffee, they are transferred to Dry Mill. The parchment coffee that Pana Coffee buys from member farmers is transported to this mill as well. Every parchment coffee is inspected per following criteria which are:

- Parchment quality
- Moisture content
- Pesticide residue
- Lot consistency

### ***COLD HULLING, SORTING, AND POLISHING PROCESS***

To make sure that there is no foreign objects or stones contaminating in parchment coffee while transporting to Dry Mill, the machine sorts these matters

out. Next step is to get rid of the coffee's parchment layer by Pinhalense cold hulling machine. This step is done without generating any heat as it will ruin the quality of coffee.

Sorting is next on the queue. The coffee is run through the sorting machine called Catador. It is the final round of sorting out small debris and particles from the coffee to get it ready for the next process.

Although parchment layer is removed, there is another layer left which called silver skin. Polishing process is to remove the coffee's silver skin. This step is done by Pinhalense polishing machine. This process is also done without heat as it will destroy the green coffee beans.

### **SIZE GRADING PROCESS**

The green coffee beans come with various sizes. The sorting process by sizes is called grading. "Typically, they believe that size of green beans and quality is correlated. The bigger beans tend to be higher in quality as they have more time in developing and ripening on the plants. However, that is not the case, the smallest coffee beans called pea berries are known as one of the very high quality with sweetness and flavor" (Scott, 2015).

Here is the chart of screen size with different terms that using around the globe (Scott, 2015):

Screen Size	Inches	Industry Classification	Central and South America	Colombia	Africa and India
20	20/64	Very Large			Elephants*
18	18/64	Large	Superior	Supremo	AA
16	16/64	Large	Segundas	Excelso	AB
14	14/64	Medium	Terceras		C
12	12/64	Small	Caracol		
10	10/64	Shells	Caracolli		
8	8/64	Shells	Caracolillo		

*Table 1: Chart of Screen Size*  
 Source: Adapted from <https://driftaway.coffee>

The uniformity of size within a lot is highly important as it affects the roasting process. The consistency while roasting is not something to overlook. The bigger beans take a longer time to roast. If the sizes are mixed up in roasting process, it may lead to the inconsistent flavor.

### ***DENSITY SORTING PROCESS***

During density sorting process, the broken, undeveloped, and defective coffee beans are sorted out. Even the coffee beans look physically fine, they are possibly lightweight and less dense. Pana Coffee uses the Pinhalense Densitmetric table to sort defected ones out. The combination of table angle, flow, vibration, and airflow is how the process is being done.

### ***COLOR SORTING PROCESS***

The last step of sorting green beans is color sorting. It is to check whether the bean's color meets the standard. This is one of the most important processes as it can ruin the coffee quality. Traditionally, the process is done by eyes and hands manually. Modernly, the color sorting machine steps in to help the operation runs efficiently and precisely. Here at Pana Coffee, they use Satake color sorter system from Japan. This Japanese optical sorting technology uses precise electronic color inspection. They can set the color of high quality coffee criteria. If any bean's color does not match with the set criteria, it will be removed from the line. The good quality coffee beans should be green, not black, brown, or white.

### **ROASTING AND PACKING MILL**

After the long journey from seedlings to saplings, harvesting coffee cherries, processing them at wet mill to be parchment coffee and passing through dry mill to be green coffee, it is time for the precious green coffee to be roasted, packed, and dipped in the coffee lovers' cups. The green coffee beans once are delivered to Pana Coffee's roastery, they must be inspected per following:



- Moisture content
- Pesticide and Ochratoxin residue
- Color and appearance uniformity
- Green coffee quality and defect analysis

### ***ROASTING PROCESS***



*Figure 10: Roasting Machine*

Roasting process essentially creates a great taste coffee. Even though how good the green coffee is, if roasting is not done properly, it can ruin the whole taste of coffee. The roasting process involves with heat. The heat will slowly turn the green coffee beans to brown or dark brown coffee beans. It ignites the aroma and flavor of coffee beans. The green coffee has a very mild and light flavor somehow like a mix of herbal tea and coffee. The roasted coffee is completely different in flavor. The tastes depend on the roasting time duration.

Pana Coffee uses a single burner system, convection roaster from Loring Smart Roaster. It is one of the most eco-friendly roasting machines. It efficiently runs with less gas consumption and emits no smoke while roasting. The machine roasts the coffee beans neatly and consistently so the quality of coffee from farm to processing is still perfectly preserved. Moreover, being the organic eco-



friendly coffee producer, they also invest in electro-static air cleaning system to remove hot air and smoke before exhausting back to the atmosphere.

There are 3 kinds of roast that Pana Coffee does for their own brands, which are:

- **Medium-Dark Roast** – This roast is rich and dark in color. The beans look oily. This roast is for a coffee drinker who prefers bold and rich flavor. The tasting notes are dark chocolatey, smoky, and malty. The roast is best for classic espresso, Thai-iced coffee, and sweet milk-based drinks.
- **Medium Roast** – It is medium brown in color. The taste is balancing between sweetness and body. The tasting notes are sugarcane, brown spice, and full body. This roast is best for milk and espresso-based drinks and black coffee.
- **Light Roast** – It is light brown in color. There is oil on the surface of the beans as they are not roasted long enough until the oil breaks out. The origin of coffee is preserved and distinguishable. The tasting notes are brown sugar, light citrus, and sweet lingering finish. It is best for filter coffee and espresso.

### ***GRINDING PROCESS***

Once the roasting process finishes, they can decide whether they would like to sell as roasted or ground coffee. For ground coffee, the roasted coffee will be transferred to grinding unit. Here at Pana Coffee runs the grinding process by bulk precision grinder. This machine creates the consistent particle size of coffee. There are many grinding styles serving different coffee products and purposes which are:

- **Coarse Grind** – It looks chunky. It is best for French Press coffee and cold brew
- **Medium-Coarse Grind** – It is less chunky. It is best for pour over coffee

- Medium Grind – It looks like sea salt. It is best for drip coffee maker and siphon coffee maker
- Fine Grind – It looks more like table salt. It is best for stovetop espresso maker which is also known as Mokka pot.
- Extra Fine Grind – It resembles to powdered sugar. It is best for Turkish coffee pot

### ***PACKING PROCESS***



*Figure 11: Packing Mill*

All the precious roasted coffee is now ready to be packed. The roasted coffee beans and ground coffee are packed in foil bag with gas valve. The consumers can smell the aroma of that particular coffee that they are interested to buy. Pana Coffee has an automated drip bag machine to handle this process. They would like to make sure that process are performed consistently with high output and created low waste. Once it is packed, the product will be sent to storage. The shelf life of roasted coffee at its best condition is about a month. After that, it is still consumable but its freshness is losing over time.

## **PRODUCTION CAPACITY**

Pana Coffee has an extensive production capacity. However, they do not fully run the production per capacity they actually have. Currently, the production is run per following;

- Wet Mill production capacity can produce 2 tons per hour, approximately 8 – 10 tons per day
- Dry Mill production capacity is 1.2 tons per hour, approximately 9 tons per day
- Roastery capacity estimates about 300 kilograms per day

As per Pana Coffee claims, the full production capacity is 2,800 tons per year. However, they only utilize just 50% of the capacity, which is about 1,400 tons per year. They utilize the capacity by doing OEM which is about 80% of the current 1,400 – ton capacity. Most OEM products are roasted coffee beans and ground coffee. Also, they lend out their production machine to those who would like to use Dry Mill and Roastery. This is to utilize the production capacity as much as they can. They predict their breakeven point will be up to 5 years or more.

## **INTERNATIONAL STANDARDS RECOGNITION**

Pana Coffee takes it serious in conforming to organics, sustainability, and food safety standards. They strive to perform at their best to keep up with standards. They obtain international recognitions per following:

- OneCerts, USDA Organics, and European Union Organic Certification for organic product certification
- ISO 22000, FSSC 22000, HACCP, and HALAL for coffee processing certification

## WASTE MANAGEMENT

As per Pana Coffee's commitment on doing business sustainably, they intend to create less waste in each production line. That is why they have invested so much on the machines in Wet Mill, Dry Mill, Roastery, and Packing Mill to make sure that their production does not pollute the environment. Their coffee cultivation is also based on environmental concern, no chemical substances are used. They make use the most of its raw material. Here are the following products from production waste:

- **Cascara Tea** – It is made from dried skin of coffee cherries. They select only fully ripe coffee cherries. These cherries is carefully pulped with minimal water usage in order to preserve nutrients and flavor of sweetness and fruity. Then, they leave it to dry until it is ready to be packed. Cascara tea helps with digestive system, reducing constipation and gastric problem.
- **Fertilizer from parchment shell** – It is a waste from Dry Mill, cold hulling process. The parchment shells are collected for blending in fertilizer. The fertilizer is used in coffee farming.

## II. SWOT ANALYSIS ON PRODUCTION

After walking through production process, here it comes to analysis part. Although Pana Coffee has manufactured coffee products not very long time, there are strengths, rooms for improvement, opportunities, and threats to be discussed in the section.

### *STRENGTHS*

- **Whole chain organic cultivation**

Pana Coffee has strong commitments in organics and sustainability from upstream to downstream of coffee business. One of their strengths is they handle the whole chain from cultivating coffee fruits until the finished products. They have the nursery to organically grow seedlings to saplings. They organically plant the saplings at their own farms. Apart from their own grown coffee, they

also create Project Shade member group to find partners who are interested in coffee organic farming in order to acquire more parchment coffee for raw material. Pana Coffee strictly conforms to organic regulation, so do the group members.

- **Organic and sustainability knowledge integration**

The integrated knowledge of organic and sustainability is somehow counted as strength as well. They promote sustainability of coffee farming. They believe that good product comes from good ecology system. The rainfall, soil, environment, altitude, and temperature are related to coffee growing. The organic farming is restricted in using any chemical substances so they have to naturally grow coffee. The soil fertility and crop nutrient are managed through tillage and cultivation. The fertilizer is from animal and plant waste. The pest control is done by physical, mechanical, and biological controls. What makes Pana Coffee to be an expert in organic coffee producer is their holistic intelligence in this particular knowledge and skill. They branch out their knowledge to coffee growers because they wish to increase more organic coffee growers in the market. This is to drive sustainability coffee business model in Thailand.

- **Production line for organic products**

The production line for organic coffee products is one of the strong points here. In order to produce organic coffee, it is not just organic from cultivation, but it also includes production process. Here, there is the production line which specifically produces the organic product. It is quite rare in Thailand in terms of organic coffee producer. This organic line would help Pana Coffee to expand the business in organic coffee market by doing its own brand and OEM.

- **Complete in production facility with eco-friendly machines**

Another strength about their production is they own the complete set of machines for coffee manufacturing. The complete facility gives them strength to work on Research & Development for new techniques, new products, and new experiments. It is beneficial to Pana Coffee as they have just set up the facility not very long time ago. They can utilize and maximize the cutting-edge machines to meet their expectations while working on their regular routine or

experimenting something new to improve the production process. More than just Research & Development, it also present Pana Coffee's potential in coffee business. Their facility can draw prospect customers and business partners. The reason is they are able to see and foresee how Pana Coffee is ready to conquer the coffee industry and elevate the standards of coffee manufacturing by promoting cutting-edge machines to produce the superior organic coffee, and using eco-friendly machines to make sure they less pollute the environment as possible.

- **International standard recognition**

They commit to international standards in terms of organic product and coffee processing. They are certified by USDA Organics, OneCerts, and European Union Organic Certification for its organic product. For coffee processing certification, they are certified for ISO 22000, FSSC 22000, HACCP, and Halal. With the international certifications, it marks that Pana Coffee is the organic coffee manufacturer who abide by the rules and regulation. In the aspect of production, their production process has been standardized to meet international standard. This will help strength up the business as well if they wish to expand their business.

So far, in terms of production, Pana Coffee has possessed several strong points that make them shine outstandingly. The know-how on organic coffee farming, organic and sustainability integration in coffee production, partnership through membership of organic coffee growers, and well-equipped production facility, these elements help strengthening the business. The raw material are managed and sourced with well-planned. The machines and facility are built to serve not only for today, but also for the future when the business is larger and the environmental concern is stricter.

### ***WEAKNESSES***

- **High operating cost in cultivating and buying parchment coffee**

As mentioned in the production process, Pana Coffee handles from growing seedlings to saplings, preparing land for doing organic farming,

cultivating coffee trees, until harvesting coffee when the coffee fruits are perfectly ripe. These processes are done by abiding with organic farming regulation. When it comes to organic farming, it comes with the high operating cost. Comparing to conventional farming, the organic farming process is more complex. It takes more time and effort in maintaining the farms. They cannot use synthetic chemical pesticides, herbicides, and fertilizers. They can only use what is authorized to use in organic farming which is more expensive and not chemical products.

Pana Coffee also buys parchment coffee from the members of Project Shade Grower Group. There are 22 members in the group now. They cannot buy coffee cherries as the time is limited from the harvest time to transport to the mill, otherwise, the cherries will be spoiled. It is easier for them to manage the incoming raw material so they buy the parchment coffee from the members. Since they have to source more material from other farms, it actually puts more cost on them. However, there are not many choices for them to do sourcing, otherwise, they will not have enough raw material to run the operation.

- **Limitation in growing organic coffee**

As mentioned earlier that Pana Coffee has own organic coffee farms up in the hill of Chiang Mai, they also found Shade Grower Group. The group members are the suppliers of organic coffee cherries and coffee parchment for Pana Coffee. According to organic farming regulation, the chemical fertilizers, pesticides, and herbicides are not allowed to use. Therefore, they cannot use any chemical fertilizers to rush the growth of coffee tree and increase its fruits. Once the harvest season comes, the amount of coffee cherries is not as much as the regular coffee farming. The amount of organic coffee parchment which is bought from the group members are not the big volume like regular coffee as well. It is crucial to expand own farms or find more suppliers in order to serve current and prospect customers, as well as strengthen the competitiveness.

- **Young coffee trees**

Pana Coffee has now grown the coffee trees for 5 – 7 years. The age of trees affects to the amount of coffee cherries that they can collect. The trees here are still young for being productive. Generally, the coffee trees are most

productive between the ages of 7 and 20. The proper care can maintain and increase the output over years. If the age of coffee trees at Pana Coffee reaches the most productive age, the amount of coffee cherries they can collect will be increased as well. However, the young age of trees is considered to be one of the weaknesses here.

- **Economies of scale**

It is important to run the production to meet economies of scale. The reason is to enhance the business competitiveness. Nowadays, Pana Coffee only utilizes half of 2,800 tons of production capacity. The operating cost in raw material sourcing is high. The processing cost is high as well because they are not running full production capacity. That results in the high cost per unit of output. If the production cannot run with cost efficiency, it will lower the company's competitiveness and affect its profitability.

To summarize the rooms for improvement of Pana Coffee, the high operating and raw material sourcing cost, limitation of productivity per crop of organic farming, the young-aged coffee trees, and the economies of scale are what lessen their competitiveness. The higher cost per output, it takes longer time for them to reach the breakeven point of their investment. It is better to run production in full capacity of machine to lower the production cost as well.

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***OPPORTUNITIES***

- **Growth in world and local coffee market**

According to BusinessWire, “The global coffee market is anticipated to reach US\$134.25 billion in 2024, growing at a CAGR of 5.32% for the period spanning 2020-2024. The factors that increases demand of world coffee market are from more home-coffee consuming, out-of-home coffee consuming, rapid urbanization, rising in e-commerce retail sales, earning disposable income, growing in demand of specialty coffee, and high coffee demand in emerging economies” (BusinessWire, 2020).



It is not just the world coffee market growing, Thai coffee market is expanding as well. As per Mr. Kavin Kittiboonya, managing director of Kavin Intertrade Co, the organizer of a coffee, bakery and ice cream fair claimed that “Coffee consumption in Thailand will continue to increase from expansion of new coffee shops across the country. This may force some smaller mass coffee brands to turn themselves into specialty, high-end coffee shops. The specialty coffee shops, those utilizing coffee-making machines and drip coffees, will continue to grow. In addition, the roasting business is improving because new baristas have more incentive to make more signature drinks to differentiate themselves from rivals.” (Hicks & Jitpleecheep, 2019).

It indicates that coffee market still have much light and plenty of rooms to grow. From the mentioned factors, Pana Coffee can seek for more opportunities in terms of capacity utilization. It is possible for them to do either own products or OEM. As they possess the cutting-edge and eco-friendly machines, it should be a good opportunity for them to utilize the vacant capacity to produce more coffee to sell domestically and internationally.

- **Growth in organic trend**

Consumers are more health-conscious nowadays. They carefully select about what they consume. The perception of organic product relates to natural growing without chemical substances so the consumers perceive that it is healthy to consume. That is why organic food becomes a preferred alternative for them due to several health benefits. The organic coffee popularity is increasing from the growth of coffee culture and the rise in premium coffee establishments, it raises the consumer’s awareness of variety of coffee. The growth of organic trend is actually a great opportunity for Pana Coffee to expand their organic business and production. If they can work themselves up to one of the top organic coffee brand in Thailand and ASEAN region, they will not only run the production in full capacity, they will have more potential in new production line investment as well as expand their organic coffee farms.

- **Shade Grower Group expansion**

Since Pana Coffee created the group of organic coffee growers called Shade Grower Group, the members of the group are the organic coffee cherries

and parchment coffee suppliers for Pana Coffee. Currently, there are 22 members who supply the raw material for them. The organic coffee market is growing in both domestically and internationally. They should take this opportunity combining with their organic experts to actively seek more those coffee growers who are interested in doing organic coffee farming to join the group. If the group gets bigger, the more organic supplies that Pana Coffee can obtain. This is good for production as they can run smoothly with no worry about the raw material shortage.

Hence, there are still rooms for Pana Coffee to grow as the demand of coffee is still increasing. People concern more about their wellbeing so it is the opportunity for organic products to expand in the market. Pana Coffee can use the market insight to convince other coffee growers to be a member of Shade Grower Group and planting more organic coffee.

### ***THREATS***

- **Illegal import of coffee from neighbor countries**

The market price of coffee in Thailand is about 60 baht per kilograms. The price from neighbor countries is 5 – 10 baht per kilograms cheaper. The coffee from neighbor countries is illegally sneaked in Thailand. Some coffee farmers and traders turn this illegal coffee for sell to coffee producers in the country by claiming that it is a Thai coffee. The reason to do is that they can make profit from it as they purchase the illegal imported coffee at cheaper price. In terms of quality control, it is very difficult to control the coffee's quality and origins. The illegal import of coffee is one of a thread for Pana Coffee as it might be contaminated in parchment coffee they buy from the members. Even though they do cupping taste prior purchasing, it is still hard to control the contamination of this illegal coffee in the raw material that they do not grow it themselves.

Apart from quality, the purchasing price structure in the country gets affected from this illegal import. Due to cheaper price, the coffee traders may force the local growers to undersell in order to compete with the illegal imported

one. Eventually, it will be difficult to increase the number of coffee growers in the country because they might be discouraged to grow coffee from the factor.

- **Global warming**

The global warming is one of the challenges for coffee growers. It is harder to grow and less tasty. The coffee trees bear less fruits because of the increasing in temperature. The quality of coffee gets affected because the coffee cherries will be ripe faster than usual. Normally, the coffee cherries ripen in the low temperature as the acidic and sweetness can slowly develop in the process. The great taste of coffee is from this particular as well. The global warming has the impacts on flavor and production quality. If the temperature gets hotter every year, the coffee trees are not able to grown eventually. Even if they survive from the heat, the quality and taste are not the same. This is considered as a threat for Pana Coffee as they will face the constant decrease in production output because the coffee cherries are less for harvest.

- **Wild fire and pollution**

There are wild fire problems in the northern part of Thailand. There is a possibility if the wild fire occurs nearby Pana Coffee's farms in the mountain, the coffee trees may be burnt to the ground. It will affect the coffee cherries harvest as the trees are destroyed from wild fire. It also takes time to grow and make it fruitful again. The wild fire has caused air pollution. The dust and ash from are all over the place. It is possible to contaminate the coffee in wet mill because the mill was built as open-air style. It also affects the health of Pana Coffee staffs who work outdoor. The staffs are important in production process as they have to inspect raw material and control quality in every process.

- **Plant diseases**

The general disease which is generally found here is coffee leaf rust, caused by a fungus called *Hemileia vastratix*. There will be small yellow spots on the leaves. Those spots will expand larger and turn orange until like rust. It has an effect on the coffee yield as the lower output they can harvest. Finally, the trees will die.

Another disease is coffee berry disease, caused by a fungus called *Colletotrichum kahawae*. The symptom is similar to coffee leaf rust disease, but

this happens to the coffee fruits. It makes the fruits shed too early before ripening. The crop output will be lower.

- **Small numbers of local organic coffee farmer**

The organic farming takes a lot of effort to do. It takes at least 3 years to do land preparation. The chemical fertilizer, herbicide and pesticide are banned to use. The method of doing organic farming is more difficult. The crop yield is less than the regular farming. It is not easy to convince the local coffee growers to do organic farming instead. If there are not many organic coffee farmers, it will be difficult for Pana Coffee to seek for parchment coffee from and costs them more on the raw material cost.

So far, the threats for Pana Coffee are illegal imports of coffee from Laos and Vietnam, climate change crisis, wild fire and pollution, plant diseases, and small numbers of local coffee growers. It is important for them to be ready to tackle with the factors so the operation will not get affected in the future.

### **III. CONCLUSION**

Pana Coffee is a serious organic coffee manufacturer who handles the organic cultivation from upstream to downstream. Sustainability is the heart of business. They follow the regulations of USDA Organic, OneCerts, and European Union Organic in terms of farming and production. They created an organic coffee farmer team called Shade Grower for any coffee farmers who are interested in doing organic farming becomes a member of the group. The registration process is required. The purpose of the group is to branch out the knowledge in organic coffee farming, increase the number of organic coffee farming in Thailand, and build up suppliers for them in terms of raw material sourcing.

Pana Coffee invested in eco-friendly machines with the up-to-date technology. From Wet mill, they select the coffee cherries from floating process, pulp the cherries skin, wash and ferment them in the tank, and later let them dry in the green house. Next is Dry mill where they select the parchment coffee by density sorting, size grading, and color sorting. Last step is at Roasting and

Packing mill where they roast the coffee beans and pack in the aluminum foil bags or filter bags. Each process is controlled by Pana Coffee staff who will handle the inspection throughout the process. They seriously concerns about environment so what exhaust from their mill must pass through particular treatment process prior emitting back to nature.

The concerns about Pana Coffee are mainly about production capacity utilization. They utilize only half of the capacity which means they have to find a way to fill up the vacant capacity so they can lower the cost per unit of production. Moreover, the cost of organic raw material is expensive and hard to find. Therefore, they should do contracted partners who can supply them continuously with constant quality and reasonable price apart from purchasing from the member of Shade Grower Group. That would help lowering the raw material cost and avoiding supply shortage. Lastly, the smoothness of operation is also what they should focus on. For example, drying coffee process could take almost a month to dry the coffee cherries and shorter time for pulped coffee. If they can reduce time in this process, it will reduce bottleneck effect in the future.

#### **IV. RECOMMENDATION**

Pana Coffee has a potential to grow in the future. They position themselves as organic coffee manufacturer which is considered to be in niche market. Based on TOWS matrix, the suggested recommendation will be per following:

##### ***MAXI - MAXI STRATEGIES***

This Maxi – Maxi strategy is a match between strengths and opportunities. The proactive strategies that will help escalating production process of Pana Coffee in terms of capacity utilization.

- **Partner up with organic coffee producers for sourcing more organic parchment coffee and bidding more orders**

Pana Coffee is fully-equipped with new technology machines and receives international recognition in terms of organic and coffee processing. It should be what they can boast and sell themselves when finding partners

domestically and internationally. Since they run the operation only half of the full capacity, it should be a good opportunity to find partners. It could be either organic parchment coffee suppliers or beverage firms who would buy the coffee from them. They could do collaboration brands or do OEM for their partners. It is also a chance for them to learn know-how from other firms within the industry.

- **Lend out services to local coffee SMEs**

Since they only use half of the production capacity, it would be a good opportunity for them as well to lend out the services to the local coffee SMEs. They already lend out Dry mill and Roastery. However, they could also lend out packing services as well for those local coffee producers who want to pack their grounded coffee in dripped bags. This could be another source of income for Pana Coffee too.

### ***MINI - MAXI STRATEGY***

This Mini – Maxi strategy is a match between weaknesses and opportunities. It is a strategy about how Pana Coffee could run the production smoothly with time efficiency in order to avoid bottleneck effect.

- **Invest in coffee drying machine**

Pana Coffee dries coffee cherries and pulped coffee in the drying house under temperature and moisture control condition. However, this process could take nearly a month to dry coffee cherries and shorter time for pulped coffee. The process heavily relies on the natural sunlight which is uncontrollable. This is considered as a time loss in terms of production and creating a bottleneck effect as it takes a long time before proceeding to next process. The process is also labor-intensive because the staffs have to keep monitoring the moisture and temperature. In order to reduce time in drying process, I would suggest them to invest in mechanical coffee dryer. It would increase the productivity by saving more time in drying process. The accuracy of heat and moisture control is more precise in term of quality control. Thus, the production would run efficiently as they save more time and are able to control the coffee quality precisely.

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