

The Logistics Collaboration in Supply Chain of Orchid Industry In Thailand

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— *Review of* —
**Integrative
Business &
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— *Research* —

ABSTRACT

This research aims to formulate the logistics collaborative model which is the management tool for orchid flower exporter. The researchers study logistics activities in orchid supply chain that stakeholders can collaborate and develop, including demand forecasting, Inventory management, warehouse and storage, order processing and transportation management. The research also explores logistics collaboration implementation into orchid's stakeholders. The researcher collected data before implementation and after model implementation. Consequently, the costs and efficiency were calculated and compared between pre and post period of implementation. The research found that the results of applying the logistics collaborative model to orchid exporter reduces inventory cost and transport cost. The model also improves forecasting accuracy, and synchronizes supply chain of exporter. This research paper contribute the uniqueness logistics collaborative model which value to orchid industry in Thailand. The orchid exporters may use this model as their management tool which aims in competitive advantage.

Keywords: Logistics, Orchid, Supply chain, Collaboration

This paper presents a logistics collaboration theory and measurement in orchids supply chain based on the researcher's earlier research in this area. It is introducing the basic concept of logistics collaboration and definitions of measurement relevant to orchids supply chain in Thailand. The logistics collaboration includes demand forecasting, Inventory management, warehouse and storage, order processing and transportation management. There are several activities that stakeholders can collaborate and develop them in orchids business from upstream to downstream. The performance assessments are quantitative tools. They are compared before and after logistics collaboration implementation between grower/exporter and exporter/international or local retailer. The results of logistics collaborative model implementation are impressive cost reduction which enhances their competitiveness over international rivals.

Orchid is an important flower for Thailand economic. The Office of Agricultural Economics found that in 2005 the orchid could be made the nation income up to 3,000 million Thai Baht in the approximately 8,198 acres, orchid production at 20,944 kilograms (Arganistapechart, 2005). The research showed that the income trend would increase to 20 percent per year. The orchid both two types (cut flower and plant) could be cultivated as illustrated in Table 1.

Table 1 Type of orchid (Everythings Orchid, 2013)

Orchid cut flower		Orchid Plant	
Orchid Genera (Total 20)	Value shared (%)	Orchid Genera (Total 211)	Value shared (%)
Dendrobium	94.73	Dendrobium	51.4
Mokara	3.69	Phalaenopsis	25.5
Aranthers	0.52	Vanda	8.9
Aranda	0.48	Mokara	3.7
Oncidium	0.44	Oncidium	3.1
Vanda	0.13	Catleya	2.7
Arachnis	0.01	Ascocenda	1.2
Ascocend	0.01	Epidendrum	0.6
Others	0.00	Cymbidium	0.3
		Rhynchostylis	0.3
		Spathoglottis	0.3
		Paphiopedilum	0.2
		Others	1.8

The Dendrobium orchid is the most favorite one for many countries, including Thailand because it was color full and long fresh. Thailand was the number one in the world about the producer and exporter of Dendrobium orchid (Dhamniyam, 2013).

Problems

According to Table 2, orchid sales decreased at 2,094 million Baht in 2012 or growth rate down at -3.34%. There are several researches of orchid discussion and brainstorm, were studied by researchers, government, academic people and stakeholders in orchid supply chain. The researcher found that it is high transportation cost, low delivery and fluctuated orchid quantity distribution, and high damaged cost.

The department of agriculture has been supported new technology, money, research to develop species and improve production quality, stakeholders in orchid supply chain should support and develop strategies to improve Thai orchid together. Especially, logistics cost in supply chain, which is higher than at 60% of sale price (Mahidol, 2013). Logistics activities are in every part of orchids supply chain and logistics cost reduction is a solution to increase market share of international market.

Table 2 Volume and Value of Fresh Cut Orchids and Buds Trade of Thailand (2007 – 2012) (Thai Custom Department, 2013)

Year	Export		
	Quantity (kg.)	Value (THB)	Growth Rate (%)
2007	24,566,928	2,515,800,900	0.80
2008	25,152,136	2,411,073,067	-3.77
2009	24,601,173	2,366,428,655	-3.37
2010	25,269,844	2,305,150,618	-0.43
2011	24,643,867	2,220,188,578	1.72
2012	20,944,851	2,094,690,122	-3.34

METHODOLOGY

The methodology of this research can be separated into 2 parts. The part one is model formation and the part two is model evaluation. It can be seen in the Figure 1. It shows the process of research methodology.

Model Formation: The researcher studies collaboration and logistics activities in businesses. There are retail, manufacturing, perishable goods and related business. These secondary researches were synthesized for new model and then primary research was applied in-depth interview with top five orchid sale companies in Thailand. Discussion was related to logistics activities in orchid supply chain and collaboration between parties in supply chain.

Model Evaluation: Pilot test was used in the same group of the top five orchid sales in Thailand. From Yin (2009) suggested that multiple case studies were advantage for support result of the research as different results are likely for theoretical reasons. This research selected 3 case studies for implementation of logistics collaboration. There are growers, exporter and retail. Benchmark was used for model evaluation that was non-collaboration and collaboration. Transportation cost, inventory cost and forecast accuracy were compared within one month after implementation.

LITERATURE REVIEW

Supply chain collaboration is a new strategy that is used in many businesses and success for many years. It can be seen that this is a new trend to integration supplier, manufacturer and customers to accomplish the same goal or win-win situation (Ramanathan, et al., 2011) (Simatupang & Sridharan, 2005).

The end customer will have own requirement which this strategy will receive demand and then these should be managed in supply chain. As previous research undertaken Grocery Manufacturer Association supported the important of supply chain collaboration has delivered real value for suppliers, vendor, manufacturer and related participants as the Customer Channel Management survey found that the only two in ten of their collaboration significant results. If companies cannot make collaboration in supply chain, they will encounter risk and barriers in both organization and trading partners (Benavides, et al., 2012).

The Cranfield School of Management investigated the drivers for success and failure in 54 long-term relationships. This research demonstrated that often a cycle of failure within the relationship could develop, creating a situation where neither party would gain advantage and where the supply chain was therefore improve service performance, profits, relationship has effective to customers and suppliers within the firm (Humphries & Wilding, 2004). As Fawcett defined supply chain collaboration as a vital dynamic capability, able to deliver differential performance (Fawcett, et al., 2012). Collaborative initiatives can involve suppliers and customers as is called "vertical collaboration" (Barratt, 2004), (Lambert, et al., 1996). However, the successful of collaborative business encounters cost, resource intensive and their outcomes are often unpredictable. Moreover, information sharing and lack of trust among stakeholders (Barratt, 2004), (Rossi, 2012), unclear and uncomfortable roles, perception of lack of mutuality and symmetry (Palmer, et al., 2012), are also barriers in collaboration. All of these barriers depict a high level of complexity.

One of the most important areas embraced by the SCM philosophy is logistics. Logisticians are by nature occupied with cross-functional matters and SCM has therefore had enormous importance in logistics research the last two decades. Within the field of logistics, we know about best practice companies that have applied collaboration based on the SCM philosophy and have achieved extraordinary good results. Logistics Collaboration is new technique in supply chain collaboration which can reduce cost, increase profit and get high customer satisfaction (Hwang & Seruga, 2011).

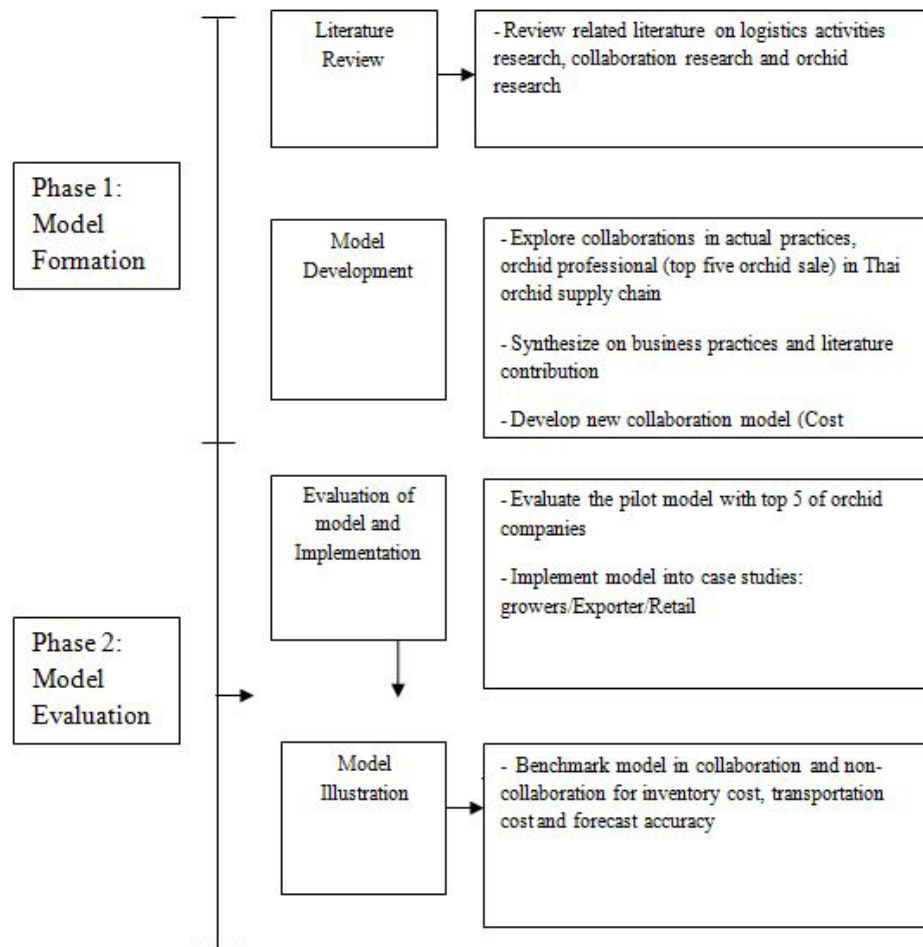


Figure1 the research diagram

LOGISTICS COLLABORATION IN ORCHID SUPPLY CHAIN

From orchid supply chain, it is found that stakeholders are supported industries, growers, exporter, wholesaler, retailer and customer. Supported industries are related to orchid tissue, insecticide, fertilize, packaging, and orchid tools. There are located nearly orchid farms. Growers will not order in advance or over stock as these are used 2-3 months/time. Moreover, price is fluctuated and high. Orchid is plant and cultivate in grower's warehouse. Different species are different cultivation time. Orchid life cycle is 2-10 years. After cutting, grower will select orchid size, number of orchids, length of orchid bouquet and color. These orchids pass quality control then they are sent to exporter. If they cannot pass, they will be sent to local wholesaler. Exporters will double check the orchid quality, pest control and re-packaging before they are transport to the airport. Then all orchid bouquets and plants will delivery to aboard and end customer. Along orchid supply chain has logistics activities.

However, collaboration, There are demand forecasting, order processing, inventory management, warehouse and storage, order processing and transportation. Plant are Logistics Collaboration in Orchid Supply Chain is related to 3 parties. There are grower, exporter and international/local retailer. It shows in Figure 2, the process, material and Information flow in Logistics Collaboration. The steps insist of demand forecasting, inventory management, warehouse and storage, order processing and transportation management.

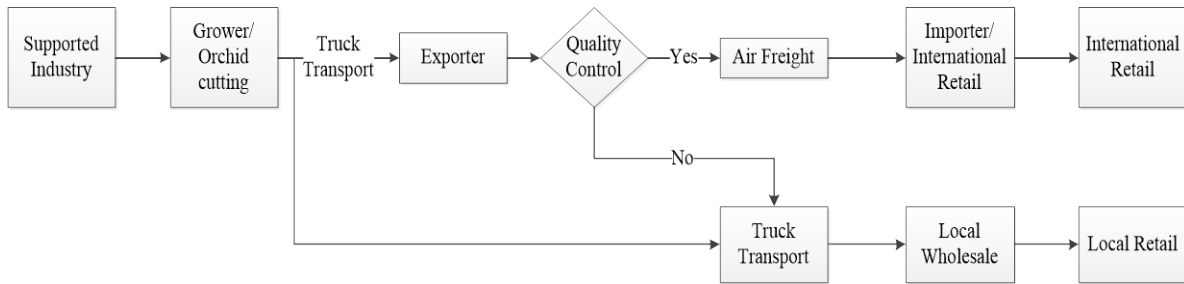


Figure 2 Orchid Supply Chain

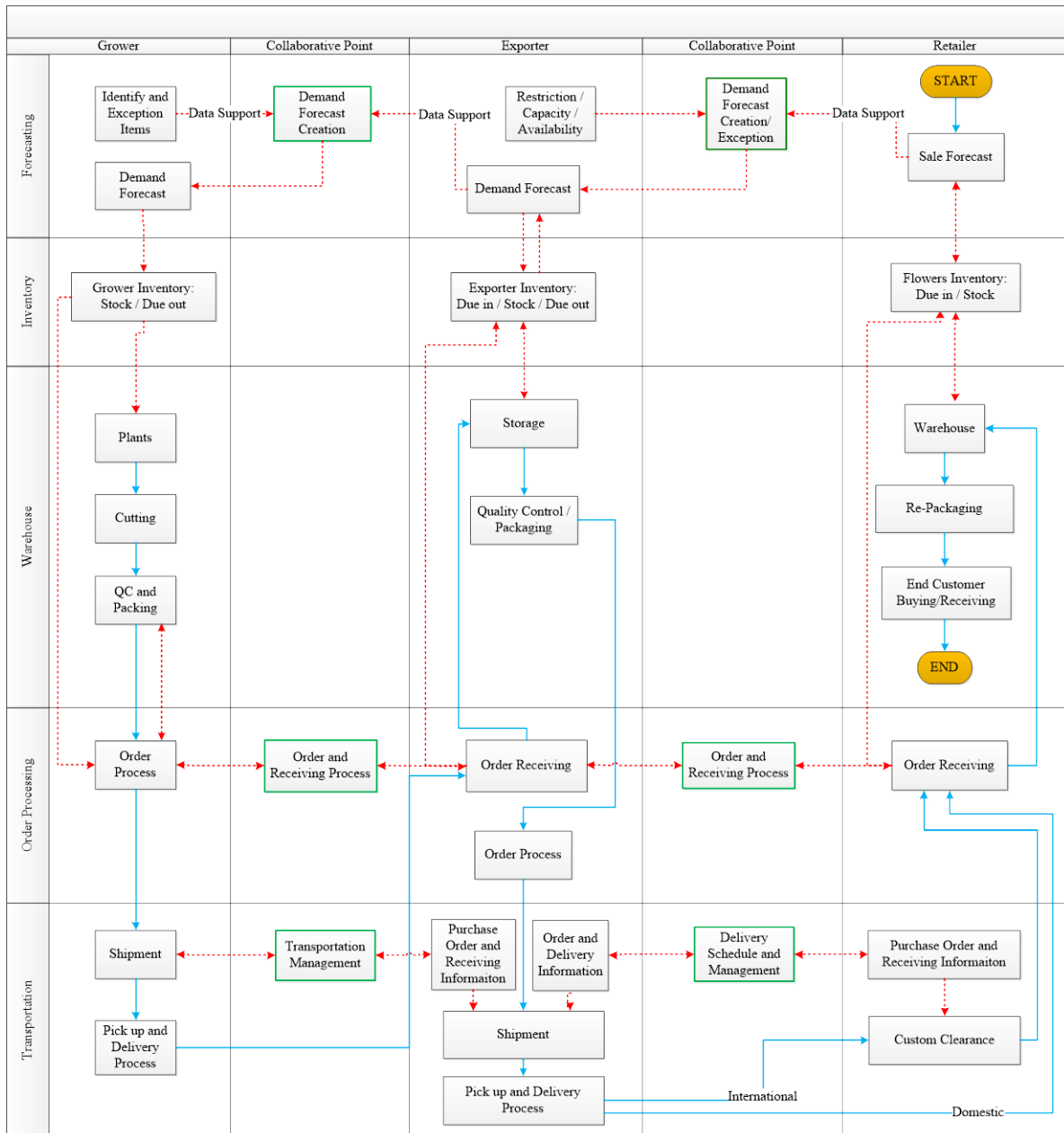


Figure 3: Logistics Collaboration model

DEMAND FORECASTING

In demand forecasting process has 6 steps. There are Item identification, Item exception, Demand forecasting set up, Demand forecasting development, Result publishing and Demand forecasting assessment. The details are as follow;

- 1) Identify Item: The party identifies orchid types of each party that are in hand or customer requirement. They support this information to collaborative point for finding out the best forecasting method.
- 2) Exception Item: As orchid types are different forecasting and cutting times, orchid demand and supply should be match in this point.
- 3) Set up demand forecasting: Both parties should decide forecasting method that is suitable to orchid type. There are trend, seasonal, cycle and random.
- 4) Develop demand forecasting: Selected forecasting method should be tested and develop for all orchid types that they order or plant.
- 5) Publish the results: Parties collect data before and after use forecasting method. This key in computer that is shared information between parties.
- 6) Access demand forecasting accuracy: Comparing data is used in this step. MAD, MSE and MAPE are evaluated forecasting accuracy.

ORDER PROCESSING AND INVENTORY MANAGEMENT

Order processing has 4 steps that include order generation, order receiving, order processing, and order fulfillment.

- 1) Order Generation: The first step is to communicate with customer and generate order. Normally, information sharing or EDI is placed when order come through customer. They order what they need and transmit order to exporter/wholesaler/grower.
- 2) Order Receiving: The party receives order from customer and then edits and enters orders to grower. This step should be shared information as error is costly. For instance, wrong types of orchids may have cost at transportation, inventory and damaged.
- 3) Order Processing: It starts with customer credit check and orchid inventory. Then using this information to plan order flow and delivery. Documentation is placed in this step. The party has to prepare bill of lading, invoice and packing slips.
- 4) Order fulfillment: The last step of order processing is order fulfillment. This step is related to picking, packing, staging and load configuration. Warehouse and transportation information is a part of this process as customer requirement information should be instruction for order specification.

WAREHOUSE AND STORAGE

The warehouse and storage diagram can separate 5 steps. There are information receiving, production process, order picking, quality control and packing. Generally, this process cannot collaborate each other but information from another process should be also generated in this process. Moreover, warehouse and storage is unique each party. The researcher has to descript each party. There are grower, exporter and retailer.

- 1) Information Receiving/Product Receiving:
Grower: In this step, grower receives demand forecasting for plants that are 1-2 years before cutting. Information support grower to plan growth of orchid tissues.
Exporter/Retailer: Product is received in warehouse.
- 2) Production Process/Storage:
Grower: Orchid tissue is plant, maintain, and fertilize.
Exporter/Retailer: Order Picking: Orchid bouquet and plant are storage in warehouse and type of orchid is screen.
- 3) Quality Control:

Grower/Exporter: in this step, they have to select orchid size, color, the length of orchid bouquet, number of orchid/bouquet and pest control. Unfortunately, quality control is not passing, orchids become damaged product or sale in local market.

Retailer: Random selection is used in retailer's warehouse. Indeed, quality control is used for pest control as government policy is related to safety and environment. However, if retailer finds an insect in orchid bouquet or plant, the same lot of orchid will be rejected and do not have payment.

4) Packing:

Grower: Orchid is pack in plastic box and cover with white flat sheet. This plastic box has limited for overlap as damage may be happen in this situation.

Exporter/Retailer: in this step is only repackaging. From plastic box, they changes to paper box and different sizes. It is depended on condition of customers and government policy. Furthermore, it is easy to transport via airplane.

TRANSPORTATION MANAGEMENT

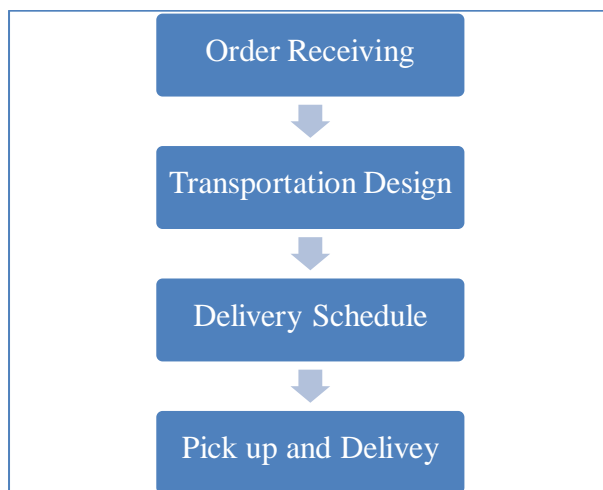


Figure 4 Transport process diagram

Transportation management is the last process of Logistics collaboration. It insists of order receiving, transportation design route/delivery schedule and pickup and delivery. In orchid supply chain has two modes of transportation; air and road modes. As orchid is perishable product, times and speed is limitation.

- 1) Order Receiving: All parties receive order to delivery. Information is from order processing.
- 2) Transportation Design: After order receiving, each party sends information to collaborative point that is about number of order, number of orchid bouquet from orchid farms, and schedule of vehicles/3PLs. Therefore, exporter/local wholesale design route to pickup.
- 3) Delivery Schedule: The exporter/local wholesale set up pickup and delivery schedule and communicates with 3PLs, growers and retailer with time schedule. Normally, it is 2 times per day as it is related to airplane schedule.
- 4) Pickup and Deliver: The last step is pickup and delivery products from grower to retailer. Documentation is happened in this process for example air way bill, phytosanitary certificate, and notice arrival. Especially, international market has custom clearance process and taxation.

BENCHMARKING IN ORCHID SUPPLY CHAIN

The Logistics Collaboration Model was used in growers, exporter and retail. The researcher had to collect secondary data from parties. There were forecast, inventory cost and transportation. We benchmarked pre and post implementation for one month with pilot test. The results were in Figure 5.

FORECASTING ACCURACY

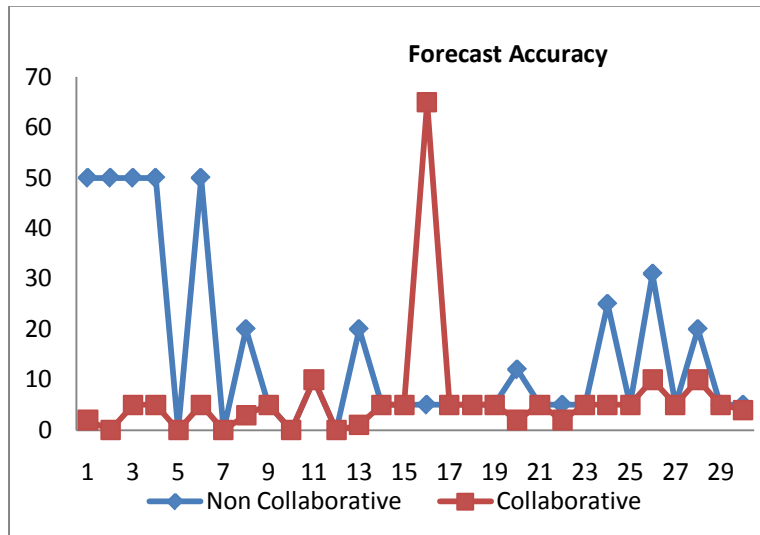


Figure 5 the comparison between collaborative and non-collaborative in forecasting

Figure 5 showed the forecast accuracy of dendobium orchid from 5 growers to an exporter. It can be seen that forecast accuracy in non-logistics collaboration were high fluctuated from 5 boxes of orchid to 31 boxes. Total orchids error was 484 boxes per month. An exporter lacked of IT communication and data history. On the other hand, logistics collaboration was implementation, It found that total of forecast accuracy was better. There was 1 box to 65 boxes. The most stock out of orchid box were in 16th of the month because of rain storm. However, the total error of orchid was lower than non-logistics collaboration at 184 boxes per month.

INVENTORY COST

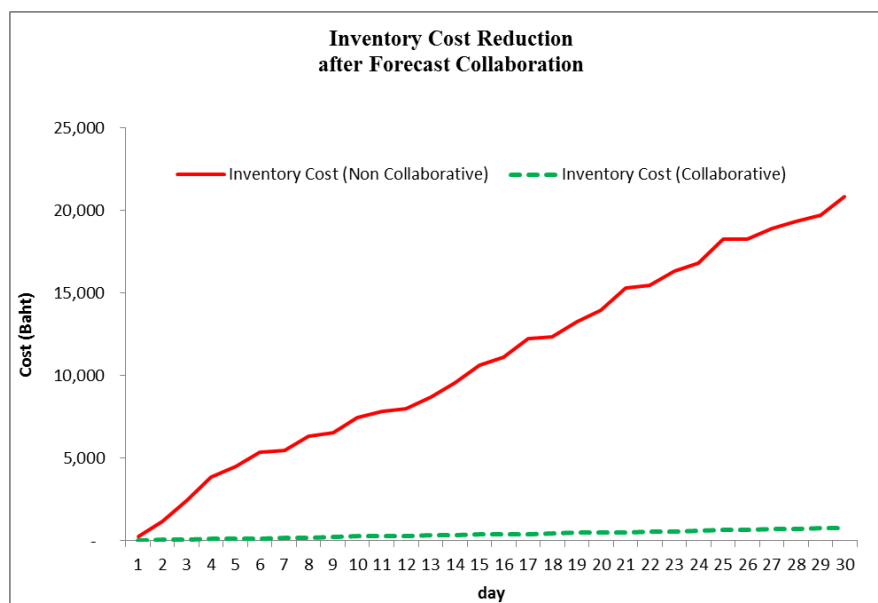


Figure 6 Comparison of inventory cost between collaborative and non-collaborative

From figure 6: It showed collaborative and non-collaborative implementation between grower and wholesale. The data were collected for 30 days. The graph illustrated that inventory cost of non-collaborative increased simultaneously from the first day at 238 THB to 20,870 THB. As inventory cost of logistics collaboration application were lower. The cost was 28 to 758 THB or total cost at 11,456 THB. It can be seen that the inventory cost reduced by 29.12% or 9,414 THB.

TRANSPORT COST

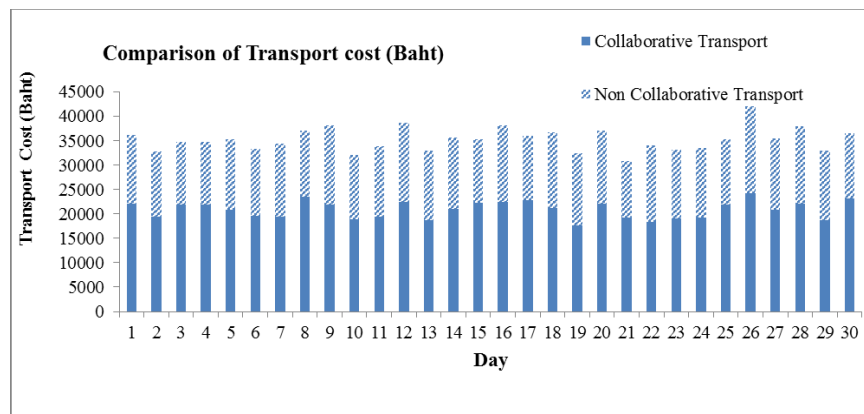


Figure 7 Comparison of transport cost between collaborative and non-collaborative

According to Figure 7, this is transportation cost of non-collaboration and collaboration in logistics activities. The transportation cost of orchid mean that cost per box from farm to airport/retail. From this graph, it found that both of them were fluctuated within 30 days. Non-collaboration was 17,574 to 24,302 THB or total cost for 30 days were 626,516 THB. However, collaborative case was 11,571 to 17,696 THB or total costs were 430,662 THB. It can be seen that the total cost of transportation after implementation decreased at 195,854 THB or 18.53%. The cost of orchid per box reduced by 2.57%.

Logistics Collaboration in orchid supply chain is a new model that base on supply chain collaboration and logistics activities. It is a model can apply in agriculture business in Thailand. However, in case of orchid business, not all 13 logistics activities can be collaborate because of business secret, different business process and various products. Hence, Logistics collaboration in orchid supply chain is collaborate in demand forecasting, inventory management, warehouse management, transportation management and Information technology. In this research, growers, exporter and retail collaborate in term of information flow from upstream to downstream to reduce cost of orchid. The result shows non-logistics collaboration and collaboration cost. Inventory and transportation cost reduced at 29.12% and 2.57%.

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