A competitive strategy on traceability implementation in the Thai fruit supply chain through Mobile Phone

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Abstract

Traceability has been one of the critical issues in agri-business industry. This paper focuses on how farmers, harvesting collectors, middlemen, and exporters are working together in order to gather necessary information to make the traceability system possible. It carries out a case study on pomelo (a citrus fruit), a native to countries in South East Asia, supply chain in Thailand. The paper also describes in detail how mobile phone becomes a means of data gathering to collect data and track the movement of fruit through out the supply chain. The impact of technology to the stakeholders in dealing with how to change work process, keep records, and trust are discussed.

I. INTRODUCTION

Farmers, harvesting collectors, middlemen, and exporters in Thailand have taken heat lately for a slew of requirements from oversea buyers. From United States to Europe, buyers have asked suppliers in Thailand for the ability to track their orders from harvest through storage, processing, packing, transport, distribution, shipping, and sales. So far that is what National Bureau of Agricultural Commodity and Food Standards (ACFS) under the ministry of agriculture also wants to do.

Moe (1998) defines traceability as the ability to track a product batch and its history through the whole, or part, of a production process. Kim, Fox, and Gruninger (1995) suggest that traceability is the ability to track back a product and its history through the whole, or part, of a production chain from harvest through transport, storage, processing, distribution and sales or internally throughout the production stages.

Pinto, Castro and Vicente (2006) argue that the requirement for traceability is limited to ensuring that stakeholders are able to spot the immediate suppliers of the product in question and the immediate subsequent recipient – one step back and one step forward. The traceability is not cover the step of retailers to final customers.

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The quality management and quality assurance standard from International Standards Organization (ISO) characterizes traceability as the ability to trace the history, application or location of an entity, by means of recorded identifications that can be used in four distinct contexts namely product (i.e., relate materials, origin, processing history, distribution, and location after delivery), data (i.e., data generated throughout the quality loop), calibration (i.e., measuring equipment to national or international standards), information technology (i.e., design and implementation of a system).

Traceability systems can work properly based on the collaboration among stakeholders that are farmers, harvesting collectors, middlemen, and exporters. National Bureau of Agricultural Commodity and Food Standards (ACFS) in collaboration with Kasetsart University, Infomining and FoodReg seek sustainable competitive advantage for agribusiness by offering a traceability system that is user friendly and convenience for everyone in the fruit chain.

II. TRACEABILITY FOR THAI FRUIT SUPPLY CHAIN

Does Thai fruit industry need the traceability system to seek sustainable competitive advantage by offering products that can track their history through the entire chain? Fisk and Chandran (1975) point out the importance of traceability to improve competitiveness of the firms. Florence and Queree (1993) underline that traceability open up opportunities to improve quality of the firm. Babade and Alfaro (2006) conclude that buyer and supplier relationships in the vegetable industry are shaped by three factors namely supplier factor, firm factor, and competitive environment factor. The traceability mechanisms and the buyer and supplier coordination are mutually reinforcing.

To come up with a traceability system for Thai fruit supply chain, a case study on pomelo (Citrus fruit) is used to develop a competitive strategy on traceability. The pomelo is the largest citrus fruit normally weighed from one to ten kilograms and can be found in Southeast Asia. It is a cross between the grapefruit and the pummelo. The flavor can be either sweet or slightly tangy.

Farmers normally have two ways of selling their pomelo. The harvesting collector comes to pomelo plantation and does the reaping themselves. The non harvesting collector lets farmers pick out the fruits for them. Then, both sell their products to a middleman who is also responsible for grading the products. The pomelo is usually graded at the cultivated area or at the middleman location. Now, middleman can sell this fruit to local market, supermarket, or prepare them for export. For export, pomelo needs to be waxed – polish the outskirt. This process is done at the waxing house or at the collecting house. Then, pomelo gets put in the container for export. Figure 1 shows the pomelo supply chain.

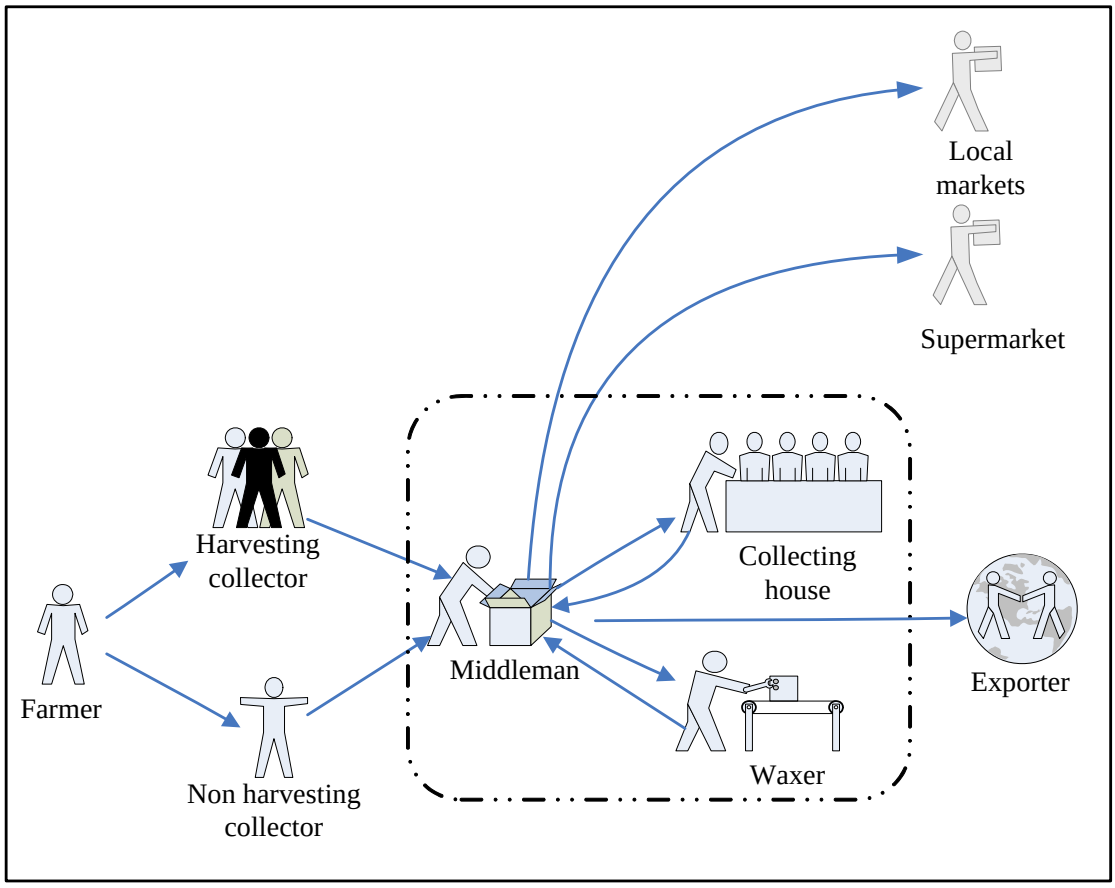

Figure 1: Pomelo supply chain

III. TRACEABILITY SYSTEM

The pomelo traceability strategy requires the collaboration among farmer, collector, middleman, and exporter. The system trace forward from a farm and a time window to a collection of export containers, trace backward from an export container of Pomelo to the farm where the fruit was harvested. In this case, everyone get assigned identification number. The process of input data begins when collector receives pomelo from farmer. The harvesting collector enters his ID number and answers a question. Is stock empty? The concept of empty lot is used here.

For example, the collector C1 may collect 500 pomelos from farmer F1 and 300 pomelos from farmer F2 on day 1. The collector C1 enters farmer ID, quantity (pieces), and weight. The collector C1 then dispatches these items to the middleman. If collector C1 clears out all stock at this time, he answers *YES* to the question: Is stock empty? On the other hand, if collector C1 does not remit all harvested pomelos, he enters *NO* in to the system and will enter *YES* in to the system once all pomelos on hand get shipped to middleman. This is a one lot size. The process continues for all dispatch events until next stock empty.

Once pomelos are received, middleman starts loading the fruits that have been waxed to a container. For traceability to work, middleman must work in one container at the time. Clearly, middleman can get fruits from different collectors. The middleman also keys in harvesting collector ID, type, size, number of boxes, container

ID, and exporter ID to the system. After buyer receives the container full of pomelo, buyer enters container ID and client ID (i.e., same number as exporter ID the middleman keys in) in to the system.

To trace backward, when there are problems with the fruits, buyer tracks back one step down and find out where the container came from. Exporter gets notified and track back to which middleman is responsible for packing pomelo in to the container. Middleman then locates the harvesting collectors that shipped pomelo to him. Harvesting then look at all harvest events since last stock empty before shipped to middleman during that time. Even with all these steps, it may not allow us to trace back to the exact pomelo grower. We can only narrow down to the last group of growers that the harvesting collector brings together in one lot size.

The above process may not seem a big deal, but to get the collaboration among the stakeholders is a difficult task. Everyone who participates in the traceability pilot project likes the idea of traceability, but without requirement from exporters or the government enforcement, the traceability may not work. Most of harvesting collectors do not want to reveal where they get their products from. Lack of trusting other partner is also the issue here. Longer term, it would require lots of effort from government, exporters, middlemen, collectors in order to make the traceability system work well. Figure 2 demonstrates how the traceability works.

IV. THE USE OF MOBILE PHONE FOR TRACEABILITY

Choosing the right equipment for traceability is a personal choice. Problem is, convincing farmers, collectors, middlemen and exporters to buy other equipments such as personal computer or notebook and carry them around for input data may be difficult. Today, mobile phone in Thailand is reasonably priced allowing anyone to have access to it.

The General Packet Radio Service (GPRS), a mobile data service available to users of GSM mobile phones, is required for downloads and installs traceability program to the mobile phone. The mobile phone weakness is in the keyboard. Even though, it is difficult to type quickly or accurately on a keyboard that is very small. The ease of carrying the input device for traceability that is small, inexpensive, and many already have them allow the traceability to be effectively managed.

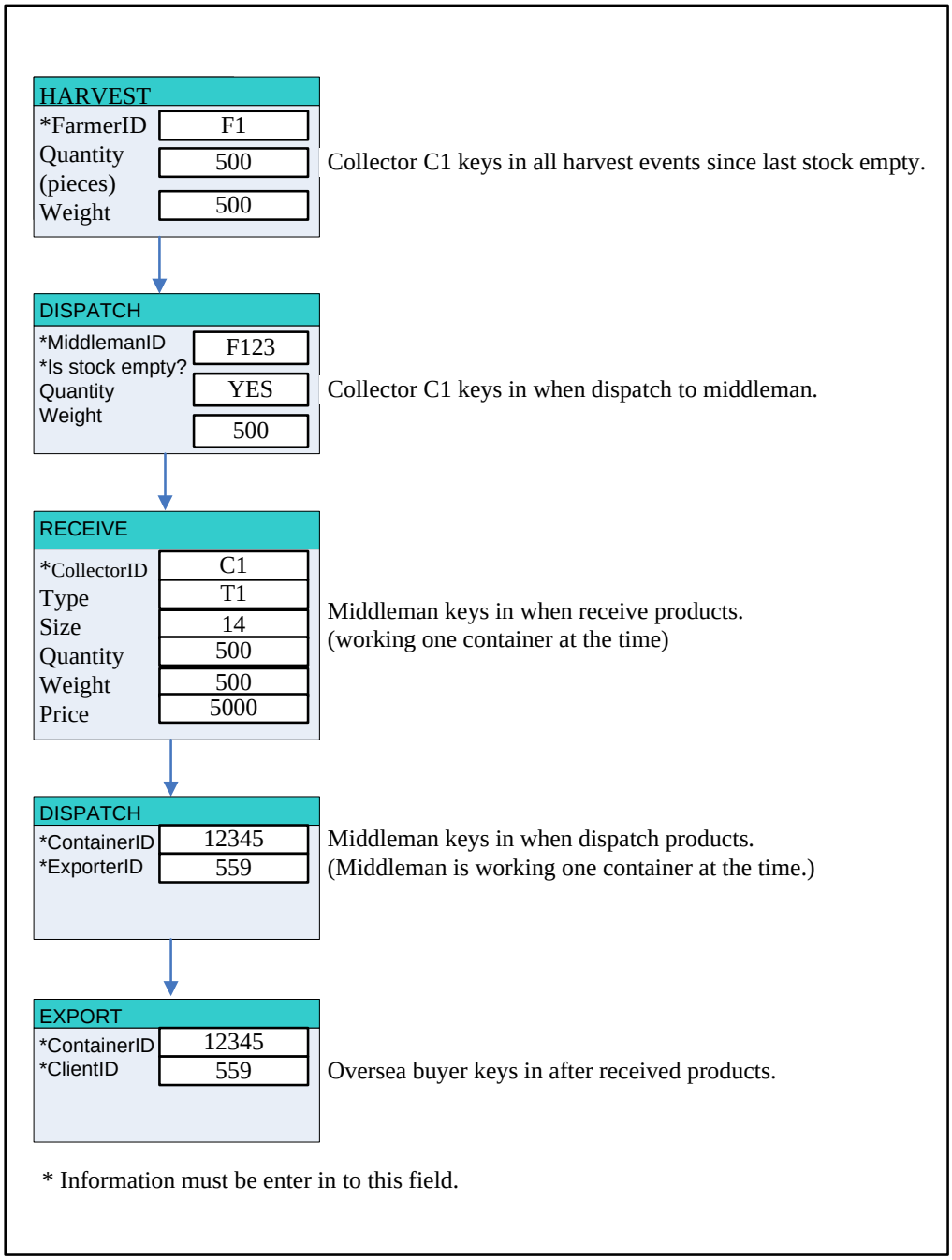

Figure 2: How traceability works

V. TRACEABILITY AS AN EXPORT BOOSTER

It is not hard to see why running traceability on the mobile phone is clearly more attractive to the farmer, harvesting collector, middleman, and exporter than carrying around other equipments. While traceability is important, not all data are essential to make the system work well. The required data are farmer ID, middleman ID, Stock empty, collector ID, container ID, and Client ID. Other data such as quantity, weight, type, size, and price are less crucial but also relevant. For successful traceability to occur it is also important that the data input is kept at minimum level. Figure 3 depicts trace form on mobile phone screen.

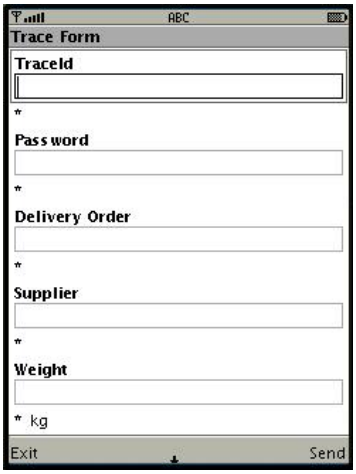

Figure 3: Trace form on mobile phone screen

Traceability can not only conform to the international requirements but also help to increase value in food safety and quality assurance, gain customer trust, and keep records to carry out the well-founded opportunity for the Thai farmers. Perhaps there are still some stakeholders who do not feel comfortable about traceability. The barrier to resistant is lack of understanding about traceability. One thing is certain, without government intervention, traceability may not work effectively. The process of putting up the traceability is viewed as a series of stages that are visit participants and explain the importance of traceability, fill in paper registration from to keep the record of participant, confirm technical specification of participant's mobile phone, send Short Message Service (SMS) with download instructions to participant, participant downloads and installs the traceability system in to mobile phone, and finally participants start using the system.

In boosting for more fruit export, traceability can help control quality and create the foundations for partnerships among farmers, harvesting collectors, middlemen, and exporters. Buyers develop more trust and confidence due to increase access to information. Traceability adds value to the products allowing exporters to use the information about products extend strategy and find more oversea companies to start doing business with them.

CONCLUSIONS

Our findings are also similar to what Pinto, Castro and Vicente (2006) has discussed. Traceability can work properly based on pen and paper versions but they are time when technology that is user friendly can help reduce paperwork, eliminate redundant, and increase accuracy. Some might argue that there are several technologies such as computer, handheld device (i.e., Palm or pocket PC) that have bigger screen would be more suitable in term of data entry than the mobile phone. However, price and availability of the mobile phone make it easier for farmers, harvesting collectors, middlemen, and exporters to participate in the traceability system.

The success of traceability will take time. Everyone needs to work together for years and years before the traceability concept is well understood by all stakeholders. Getting people involved with the system is not an easy task. The success of traceability comes down to the people, the trust, the exchange of information, and what value stakeholders place on it.

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