SOCIAL MEDIA FOR SMART FARMER- SHARED FARMING EQUIPMENT MODEL

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ABSTRACT

This research offers a roadmap for creating a concept for building a collaborative and connected mobility model to share the agricultural machine. The study aims to adopt those models to create a collaborative and connected mobility model as a Shared Agricultural Machine Network for Smart Farmer. The fact that Thai farmers are facing the aging crisis, like all other industries and farming machinery has become a need for manpower replacement to keep their earning for livings. Unfortunately, these machines are often expensive, so they can own only a few, and when it comes to reaping the harvest season, and they often require different tools for specific purposes. Our survey has shown that farmers have different ways of cultivating different crops at the same time this implies that in harvesting season there are unused agricultural pieces of equipment available to share among them. The model of shared farm equipment could lead to new farmers' way of life and it' s time to become smart- farmers. This paper will discuss important considerations, including the need for challenges, trends, and opportunities for farmers to have machinery when needed and to share what idle with others via a peer-to-peer network using mobile application platform.

Keywords: 1) Social Media Networking 2) Agricultural Equipment Sharing 3) Farming Equipment Sharing 4) Collaborative Mobility 5) Peer-to-Peer Network*k*

1. Introduction

Today, Thai farmers have their aging crisis, the lack of man power from their villages and communities causing less productivity. Farmers are looking for the agricultural machinery and equipment, such as a compact tractor, harvester, cutters, and crane, to increase agricultural productivity. Unfortunately, the machine is expensive and there is often a shortage of machine when it comes to seeding or harvesting season, and our survey shown that even in the harvesting season these machines are often idle or lack to synchronization with the farmers who want to use this equipment. Investing new machinery and equipment is one possibility but not it' s not feasible solution for the small farm owner because their farm is so small, and the maintenance cost seem too high for them. The model of shared farm equipment could lead to new farmers' way of life and it's time to become smart-farmers.

In addressing this issue, comparing to the vast emerging mobile technology platform that applies to passenger vehicles leverages positive indirect network effects between the supply side and the demand side – like Uber, Grab, etc. – many perceived this as one of the disruptive technologies. Provides a vision of creating holistic and individual farmer through technology, along with examples in the form of adaptive usage. An overview of the ecosystem

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technology to support such a vision is described. This includes monitoring systems, maintenance platforms, and data-driven models to measure the prevalence of the farmer. Finally, this article offers a roadmap for creating a concept for building a collaborative and connected mobility model to share the agricultural machine. The study aims to adopt those models to create a collaborative and connected mobility model called SaM-SF, Shared Agricultural Machine for Smart Farmer. This article will discuss important considerations, including the need for challenges, trends, and opportunities for farmers to have machinery when needed and to share what idle with others via SaM-SF technology platform.

2. Literature Review

In the agricultural value chain, when farmers select crops that are suitable for the season, improve the yield and produce the desired quality, they must invest in agricultural production by purchasing inputs such as seeds, plants, fertilizers and phytosanitary products. Agricultural tools are important inputs in the value chain of agriculture. Especially in the era when agricultural labor is lacking, while demand for agricultural products continues to grow. However, for the agricultural sector, investing in machine tools wisely would reduce production costs and result in higher incomes for farmers. Figure 1. shows the use of agricultural tools in the agricultural value chain (A typical Agricultural Value Chain, 2018).

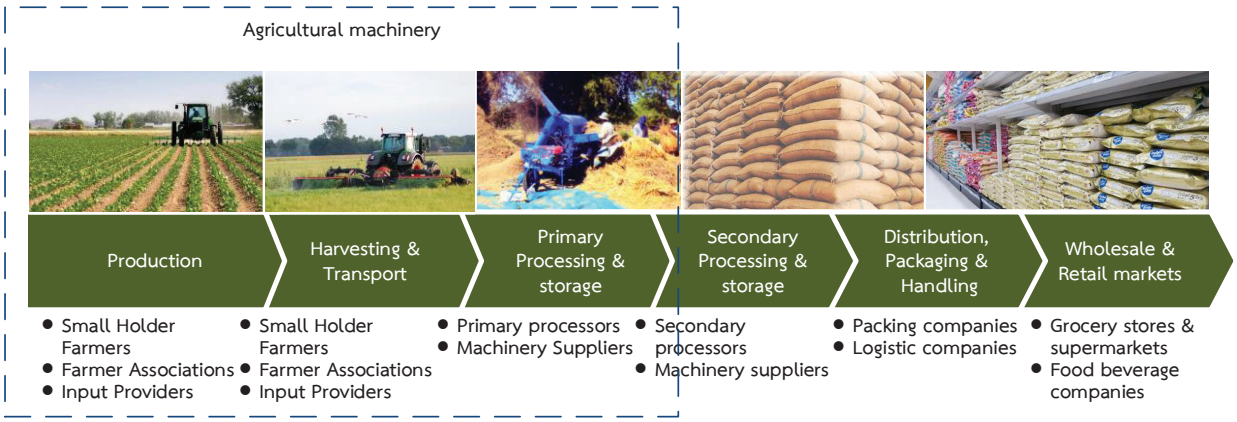


Figure 1: The uses of agricultural tools in the agricultural value chain (A typical Agricultural Value Chain, 2018).

Newer farmers are turning to machines to increase agricultural productivity, in a meantime, advanced technology has changed the way of life, business, and the world economy. Technology leads to changes in people the lifestyle and business approach. Business sectors initiate new products and services to raises the total value between manufacturers and consumers.

Social media and social networking have become a new marketing tool for business where anyone can share opinions and attitudes for their services and any related information. Currently, social media has changed and updated over time in the various contexts of technology development, which influenced human behavior in these days whether communication via the internet or search engine to seek any useful information in daily life, including e-commerce and entertainment activities.

Sharing farm machinery are implemented in many countries. For example: Basarik and Yildirim (2015) showed interesting model in Turkey These are State machine park, Neighbor assistance, Farm machinery contractor, Machinery partnership, Machinery cooperatives and Machinery rings. Their research found that in Turkey shared farming equipment help in farmers and cooperative to justify demands and supplies but it's still many idle machine and human in the supplied-chain and still have difficulty to control time and places to improve efficient of these farming equipment's.

E- Services and mobile commerce have been adopted by various industries and government services. The usage of smart phone is widely used in Thailand (more than 120 Million numbers). However, the internet usage of smartphone are games and social media applications. There are many researches and developments to show the implementation of using social media in conglomerated organization like PTT PCL (Achara C. et al., 2016). The smart labor that using social media to solve their worker pickup problem (Paradorn K. et al., 2017) show the relationship with GPS and mobile application to solve smart labor and their transportation to work, Social Communication for Smart Farmers in Durian Society in 2016 (Samard D. et al., 2016) show the relationship and combined lifestyles of durian farmers with their customers via social media. However, the shared equipment like UBER (https://www.uber.com/) or GRAB for shared farmer equipment are not existed in Thailand.

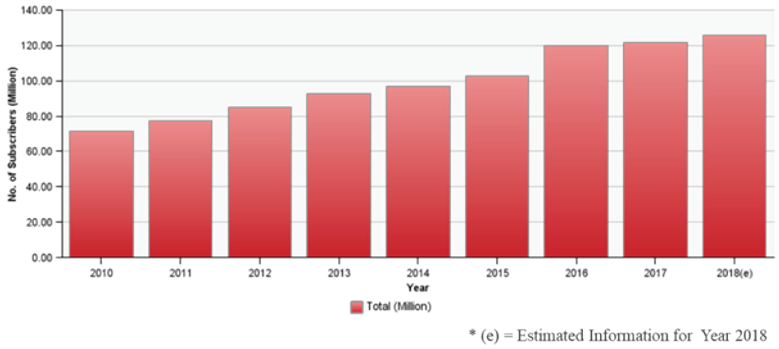


Figure 2: Mobile Subscribers in Thailand (NBTC, 2018)

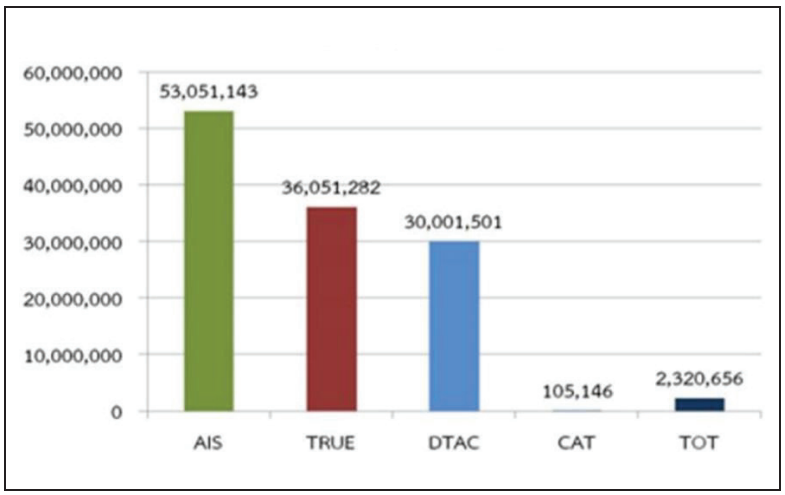


Figure 3: Number of mobile subscribers classified by service provider (NBTC discloses statistic, 2018)

The social media and e-Commerce models are more and more popular in Thailand. Number of Facebooks and line users are rapidly increased. There's no need for training how to use Facebooks and Lines. The implementation of mobile application based on social media and web will impact farmers and create more impact to the economy.

The statistic declares by Thailand Office of National Broadcasting and Telecommunications Commission (2018) show that mobile subscribers in Thailand have been increase from 60 million up to more than 120 million within nine years. For voice data of 3 major operators, between 2557 and 2560, there will be a continuous decline. By the year 2014, the volume of voice services is 70,720.42 million minutes in 2015, down to 62,851.09 million minutes, in the year 2019 down to 51,021.48 million minutes and in 2560, there were 43,460.84 million voice services. In the year 2017, Thai people use their voice over cellular service for an average of 2 minutes per person per day, down from the previous year's average of 4 minutes per person per year provider (NBTC discloses statistic, 2018).

3. Research Methodology

In addressing this issue, comparing to the vast emerging mobile technology platform that applies to passenger vehicles leverages positive indirect network effects between the supply side and the demand side – like Uber, Grab, etc. – many perceived this as one of the disruptive technologies. Provides a vision of creating holistic and individual farmer through technology, along with examples in the form of adaptive usage. An overview of the ecosystem technology to support such a vision is described. This includes monitoring systems, maintenance platforms, and data-driven models to measure the prevalence of the farmer. Finally, this research offers a roadmap for creating a concept for building a collaborative and connected mobility model to share agricultural equipment. This study aims to adopt those models to create a collaborative and connected mobility model called 'Shared Agricultural Machine for Smart Farmer' (SAM-SF). This article will discuss important considerations, including the need for challenges, trends, and opportunities for farmers to have machinery when needed and to share what idle with others via our technology

This research using constructive research model aimed to design, construct, and demonstrate on an mobile application name T-Farm on play store and app store. Within the app, farmers together with equipment owners can connect and create relationship with farmers to farmers, farmers to equipment owners and equipment owners to equipment owners, these relationships create new kind of social media that bring more efficient social power to the shared farming equipment.

4. Results

After we developed an application on smart phone and host this app on google Play store and apple Appstore using the name T-Farm. T-Farm has ability to share tractors and other farming equipment such as harvester and cutting glass equipment. By next year, we decide to implement B2B market place for matching all truck and labor to provide more efficient farms and smart farmers. The model name *Shared Agricultural Machine for Smart Farmer Model* was created as shown in figure 4 and figure 5.

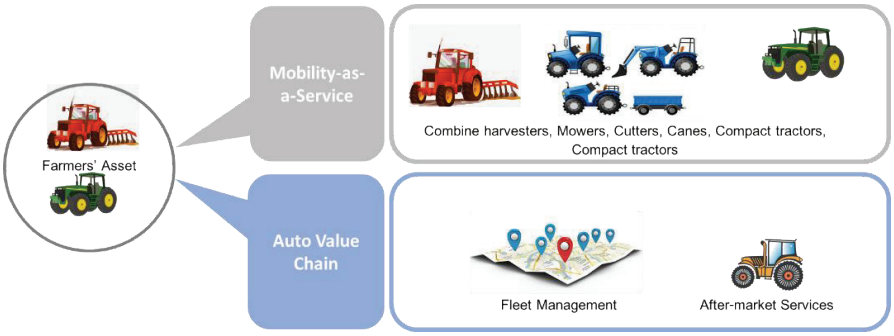


Figure 4: Shared Agricultural Machine for Smart Farmer Model

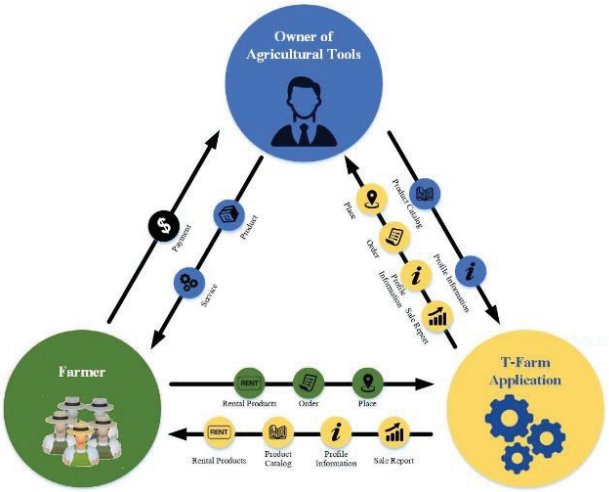


Figure 5: T-Farm Application Conceptual Design

4.1. The Design and Implementation of T-Farm Application

We used android studio to build application on google android phone (JAVA) and swift X-Code for IOS. The design of the program based on web and MS-SQL and C# on server. Farmers just choose what kind of machine he wants and point and click on location and time that are needed to deploy service on location. This model will provide accurate and precision time to service (no more waiting time for farmers and equipment). Figure 6 showed BPM notation of T-Farm development. Figure 7, 8 and 9 showed the actual implementation and real work of the application.

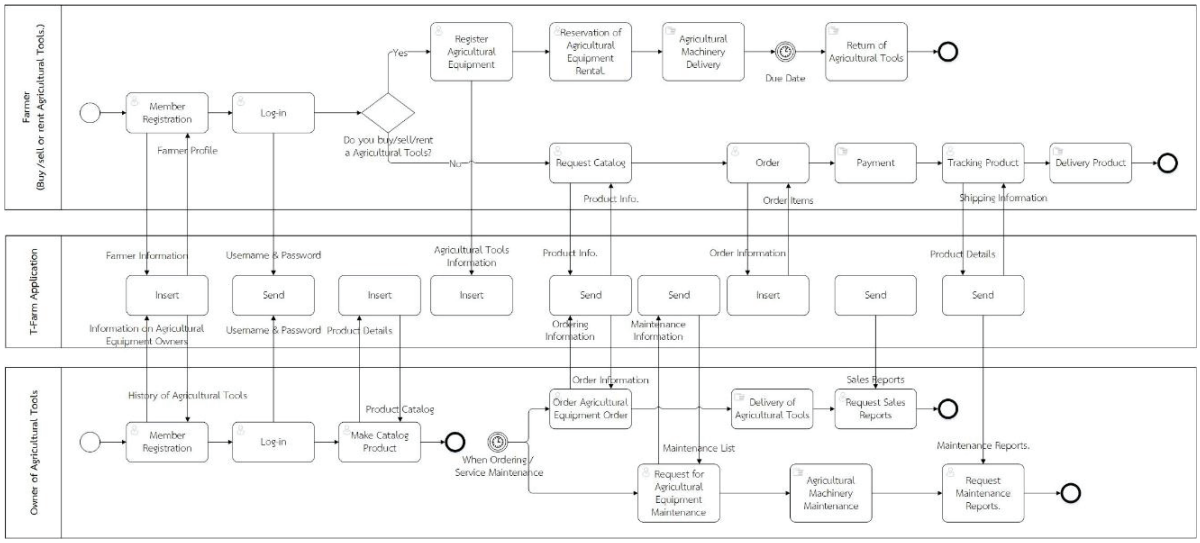
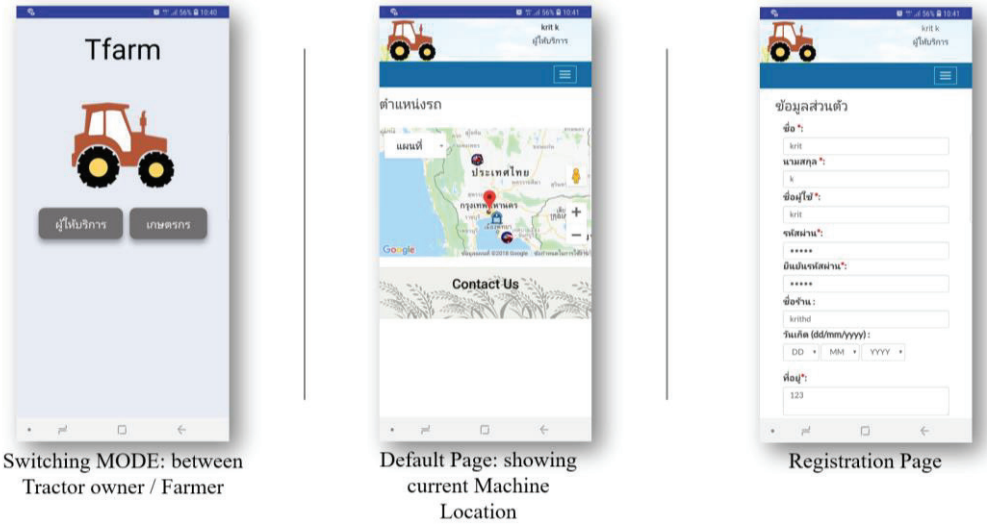


Figure 6: T-Farm Workflow using BPM Notation
(Business Process Model and Notation, 2011)

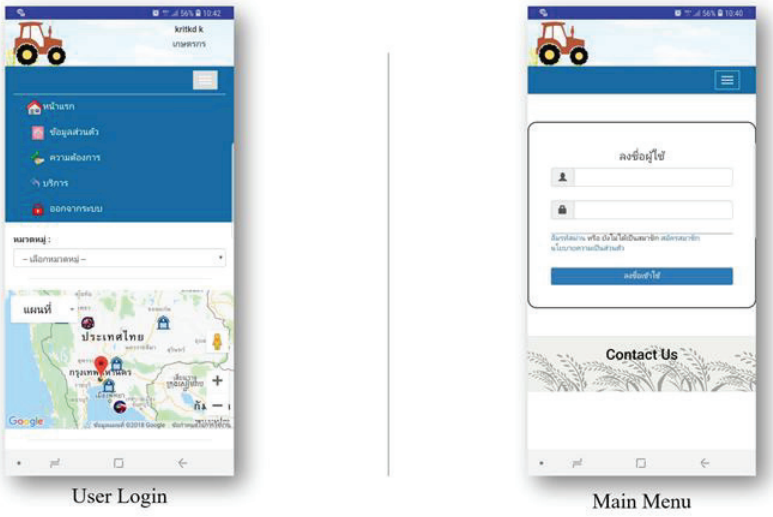


Switching MODE: between Tractor owner / Farmer

Default Page: showing current Machine Location

Registration Page

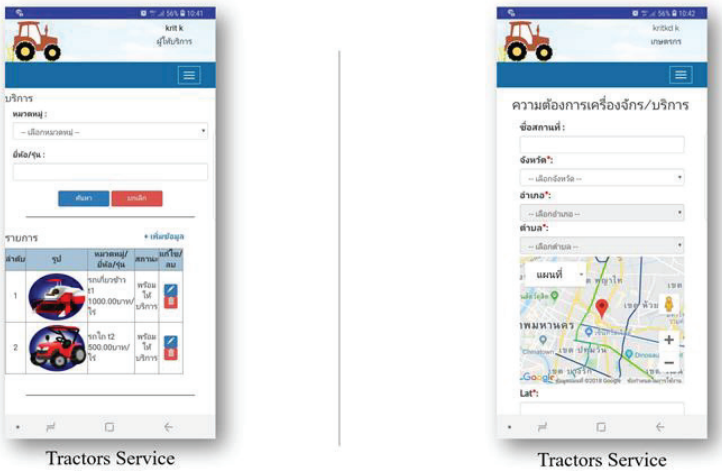
Figure 7: T-Farm Mobile Application



User Login

Main Menu

Figure 8: T-Farm Application service both farmers and equipment providers via location based (GPS) on smartphone



Tractors Service Available

Tractors Service Request

Figure 9: T-Farm Application show input form to match between the demand and the availability of farming machine

5. Conclusions

To evaluate the usability and benefits of using SAM-SF for farm machine sharing, we have selected a sample of 80 farmers to use SAM-SF to share their machines among them and experiment on the generation of various sharing models. Then they input availability of theirs machines and use SAM-SF as a collaboration tool to share their machine during the period from Jan 2017 to December 2017. After which, they answered the set of questions and a set of Likert-scale assessment. These volunteers will be referred to as respondent in this section.

5.1. Evaluation

In the evaluation of SAM-SF, the respondents were 60% using machine for production, 30% using machine for harvesting, and 10% using machine for primary processing and storage. Our respondents are farmers who experience using mobile phone.

5.2. Findings

The respondents are 65 % farmers who own agricultural machine and 35 % are farmers who do not own any agricultural machine. Most of them are young adults between 22 and 40 years old. We also collect the annual income, and information about their planting crops and its season for production, harvesting and primary processing & storage. A total of 20% of the respondents plant their crops at the beginning of rainy season, in May to July (ปลูกต้นฝน) and 30% plant their crops Planted before the end of rainy season, in December to February (ปลูกปลายฝน) and the rest 50% planted their crops all year round. Harvesting and primary processing & storage duration are various based on what kind of crops and theirs yield.

Overall, the respondents, after using SAM-SF for trip planning and real-time adjustment of the trip plan feel that the SAM-SF is a trusted tool for sourcing farming machinery when needed. Compare SAM-SF to the conventional advice from friends and internet search, the SAM-SF recommends available machine is very acceptable in terms of where it located, how far of the available machine form the farm (distance between farm and the available machine), information about the machine as well as the rental model.

In conclusion, SAM-SF, is an essential tool for a farmer to a collaborate their machine sharing. A user can specify types and number of machines needed with related information including the specific features, or let the system retrieve available machine nearby shown on the google map. The user can use SAM-SF to offer their idle machine to others by check-in the machine location and brief description about its functions as well as taking the photo of the machine using mobile device touch. During using the machine, the owner can use SAM-SF to monitor his asset borrow to other. After all processes, the user can manage his assets back to his farm or sending directly to the new matching farm, if any. Since SAM-SF interfaces with google mapping function, it derives all the benefits of identifying current position, time to destination, street view, and alternate route.

From the evaluation data, most of the people who has used the SAM-SF gave very favorable rating. SO, to deploy SAM-SF for public use, a cloud-based implementation can be carried out so that it can be accessed from any location. Moreover, the model itself can be generalized and extended to cover over all farming area in in Thailand. As for extending work, the development a farming network base on the concept of SAM-SF Platform, which not only the farmers can register to share various agricultural tools, but also manufacturers of machine tool vendors and other agricultural products can be registered for purchase, offering, and maintenance services through the SAM-SF Platform. This future work must also take into consideration of create trust model using blockchain and smart contract to ensure all real matching deal including payment method to receive and pay rental fee or

service charge. In summary, SAM-SF is a new way for farmers to collaborate in real time to build a peer-to-peer network of sharing agriculture machinery and equipment.

6. References

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