

Guidelines for IT Use for SCM and Logistics in Agricultural Product Industry in Nakorn Pathom Province

Thongchai Surinwarangkoon

¹Department of Business Computer, Faculty of Management Science
Suan Sunandha Rajabhat University
Bangkok, Thailand
Thongchai.su@ssru.ac.th

ABSTRACT

This qualitative research aims to study on Information Technology (IT) use for Supply Chain Management (SCM) and logistics in agricultural product industry and IT guidelines for development of sustainable SCM and logistics in agricultural product industry. The research samples compose of two groups. The first group was 400 samples who are entrepreneurs, farmers, processing plants, wholesalers and exporters in logistics and supply chain commodity in Nakorn Pathom province. The samples are selected using simple random sampling. The tool use to collect data for this group is questionnaire. The second group was corporate executives and technician representatives, total 10 samples, who are corporate executives and computer staff in agricultural product industries. The samples are selected by purposive sampling. The tool use to collect data for this group is in-depth interview. Then research data was analyzed by descriptive analysis. The result found out problems in IT use for SCM and logistics in agricultural product industry in terms of security of information system, competency of computer network, technology of computer hardware and software, and lack of expertise staff in IT. Guidelines to develop sustainable IT use for SCM and logistics in agricultural product industry are to focus on 1) Corporate IT infrastructure has to be up-to-date. The management has to support adequate resources and investment in improvement of IT infrastructure and computer network effectively. 2) Relevant information in SCM and logistics must be integrated. Provided Information System must support processes of information creating, storing, sharing, and use of information about raw materials, productions, sales and logistics between business partners. So each organization can create and share useful information to business partners via communication channels effectively. 3) Employees' skills and knowledge in information technology usage for SCM and logistics must be developed in order to support the growth of the open trade in the future. 4) Adequate security for SCM and logistics information system must be established. To protect and apply information system efficiently, organization will have advantage and competitiveness in sustainable business.

Keywords: Information technology; SCM and logistics; agricultural product industry.

INTRODUCTION

Thailand was ranked 12th exporter of food and agricultural products in the world. Agricultural sector has a key role in generating income and creating food

support. Food price in the country is low and it keeps economic balance because Thailand has comparative advantage in the production of certain products. Thai

farmers hold higher producing than neighbor countries while the agricultural market is highly competitive.

Nowadays, the main problems of Thailand's agriculture are the rapidly degradation of natural resources due to the use of chemical in agriculture and urban growth, water shortage, young labor shortage, impact of epidemics such as bird flu, effects of liberalization of agricultural trade, fluctuations in crop prices, and global climate change. Moreover, Thai government supports a lot of budget in order to support agricultural prices.

In the future, Thailand still faced with numerous problems and challenges such as labor shortages, water shortages interspersed with flooding, degradation of natural resources and external challenges such as climate change, global market demand for clean and safe food, etc. These factors will affect its ability to compete, poverty of small farmers, disparity of income in the country, food supply for poor farmers in some areas, including food supply for the world's citizens [9].

However, modern agriculture and modern SCM is still in the relatively limited scope of the middle class in urban markets and export markets. The most of farmers in the traditional market still faced with the volatility of output and prices, and low income.

In globalization, businesses are competing more fiercely. The effect of global economic conditions, natural disasters, terrorism, and political conditions affect business operation around the world.

Under the advancement of IT, business organizations have to use IT to facilitate fast and accurate in their business operation appropriately in order to achieve a competitive advantage in business. The study of the development of SCM and logistics will extend the boundaries of

modern agriculture and help Thailand develop the ability to conduct agricultural product industry and increase capability of competitive business.

Research Objectives

This research aims to study IT use for supply chain management and logistics in agricultural product industry, and find IT guidelines for development of sustainable SCM and logistics in agricultural product industry appropriately for the benefit of the businesses.

Research Scope

This research relies on a form of qualitative research which focused on the development of IT for SCM and logistics in agricultural product industry in Nakorn Pathom province, a source of vegetable crops in agriculture due to lots of abundant soil and water resources throughout the year, in order to find the possibility of the development of IT for SCM and logistics.

literature review

The original concept of logistics is the process to obtain goods, storage goods in warehouses, and distribute the right products to consumers at the right time and correct location with the correct conditions, quantity, and cost [1].

The modern logistics emphasizes on three types of activities: handling and shipping for both of finished goods and services, information exchange, and money transfer and payment as shown in Figure 1.

The concept of modern logistics not only focus on the movement of goods at the right time and the right places, but it also emphasizes on time reducing management and effort wasted activities, getting rid of thing that does not add value.

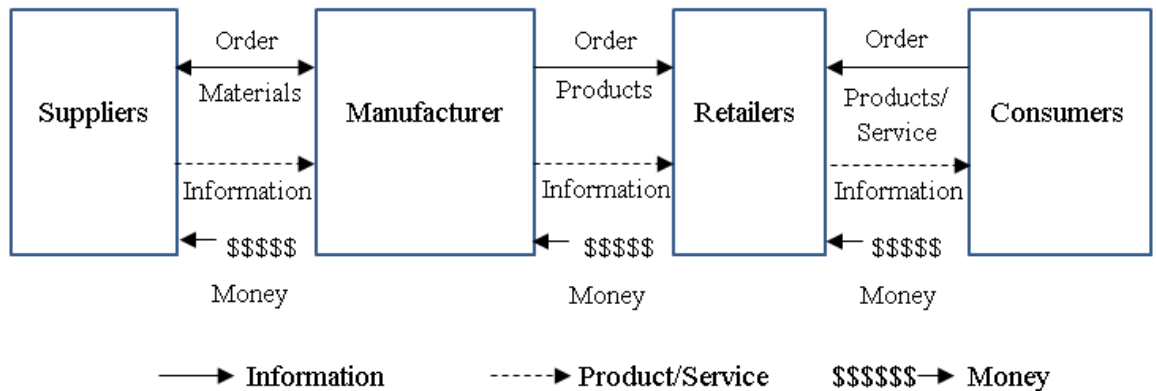


Figure 1: Logistics and three types of activities.

Resources are used cost-effectively and can meet the needs of their clients. It also known as lean logistics and lean manufacturing which focuses on the flow of goods, services and information instead of focusing on inventory or stock.

In modern management, SCM has a broader meaning than the meaning of logistics. Logistics is one of the five key elements of SCM: business alliances, IT, lean logistics, lean manufacturing, and business process integration [6].

SCM activities are manufacturing products with high added value and quality to meet the needs of customers. Product or service is delivered to customer with the lowest cost and trusted service.

The added competitive advantage in logistics strategy in palm oil industry was studied. They found that IT was used to assist their work in various departments, especially for communication. IT use for logistics resulted in the immediate, flexible and quick work operation. These made palm oil industry be capable of rising business competition, cost reduction, and fast response [4]. Logistics management system for cassava plant with RFID was studied and found that many cassava

factories in Thailand were lack of effective logistics management within the plants. The ineffective management made process of purchasing raw materials from famers to the plant late which had direct impact to other related processes such as warehouse management, product distribution, which also affected higher costs of overall national logistics management. The research developed a logistics management system within a cassava plant by using RFID technology to handle cars and trucks in the queue for weighting and tracing vehicles by web service technology in order to link internal logistics management system with the company's existing Enterprise Resource Planning (ERP) system [3].

Intranet was used in communications within the enterprise which can support collaborative work rapidly. Organizations can reduce the amount of internal resources significantly and corporate costs were down [2, 5, 7]. Moreover, extranet was used in communications within the enterprise and between commercial organizations [8].

The concept of SCM and logistics consists of links between those concerned by the

information, production management and logistics, and integration of business processes with maximum efficiency.

Research Methodology

Two research sample groups were studied. The first sample group was entrepreneurs who were engaged in SCM and logistics of agricultural products in Nakorn Pathom; farmers, wholesalers, entrepreneurs, operators of processing plants and exporters, the samples were selected using simple random sampling based on a sample size of Taro Yamane at the confidence level 95 percentages. The questionnaire collected data from a sample of 400 samples.

The second sample group was corporate executives or computer staff in agricultural industrial in Nakorn Pathom about the development of IT for SCM and logistics of agricultural products industry in Nakhon Pathom. The samples were selected using purposive sampling. Data was collected from 10 samples in this group.

This research was a qualitative research using in-depth interview with individual samples. Structured questions were prepared in order to obtain information on depth. Questionnaire was also used to collect relevant data, such as, general information of samples, channels of IT use for SCM and logistics, objectives of IT use, problems of IT use, satisfactions with the use of IT, and suggestions of appropriate IT use for SCM and logistics in the future.

Primary data were collected from two sectors: 1) In-depth interview with corporate executives and computer staff in agriculture and logistics businesses in Nakhon Pathom province, totally 10 persons, 2) questionnaire to entrepreneurs in SCM and logistics of agricultural products in Nakorn Pathom. The target group included farmers, wholesalers,

entrepreneurs, processed workers and exporters, totally 400 persons.

The secondary data were theoretical concepts, related research, and related information. Theoretical concepts consisted of concept of logistics, SCM, and IT application in businesses. Related information composed of RFID usage, ERP, intranet, and extranet. These data were used as references, as well as framework for the study.

The data was analyzed from questionnaires and interviews. Data from questionnaires were analyzed using descriptive analysis method in terms of percentage, average and frequency. Moreover, data from in-depth interview was analyzed by data reasoning and relation, and presented in analytical description complying with the research objectives according to the theory, related research as a framework for analysis.

Research result

60.50 percentages of samples were males aged 25-34 years old, and graduated bachelor degree. 55.50 percentages of samples were entrepreneurs and 25.75 percentages were company employees, earn between 10,000-20,000 Baht per month. 44.50 percentages of samples' organization were retail business enterprises, 33.25 percentages were production or service businesses, and 26.75 percentages were wholesale businesses, respectively.

The research results of the study on the channels of IT for SCM and logistics of business found that the most of samples used phones, e-mail, intranet and corporate website for their business management as shown in Table 1.

Table 1. Channels of IT use for SCM and Logistics in agricultural product industry

IT Channels	Users (Persons)	Percentage s
Phone	313	78.25
E-mail	197	49.25
Intranet	173	43.25
Corporate websites	164	41.00

Table 2. shows objectives for IT use in SCM and logistics which consisted of ordering, sales, payment, internal coordination, and planning, respectively.

Table 2. Objectives of IT use for SCM and Logistics in agricultural product industry

Objectives	Users (Persons)	Percentage s
Ordering	264	66.00
Sales	185	46.25
Payment	185	46.25
Internal coordination	132	33.00
Planning	116	29.00
Report data access	86	21.50
External coordination	84	21.00

Problems of IT using was analyzed by 5-levels rating scales. The research results found that overall problems of IT using was at moderate level. Main problems of IT use for SCM and Logistics were in terms of use cost, reliability of

information, data accuracy, timeliness, flexibility, complying with the requirements, completeness of data, and security of information systems as shown in Table 3. However, their satisfactions for IT using for SCM and logistics of the business was at high level because of modernization and ease of use factors.

Table 3. Problems of IT use for SCM and Logistics in agricultural product industry

Problems	Average	Standard deviation
Use cost	2.98	0.66
Reliable of information	2.83	0.64
Accuracy	2.80	0.66
Timeliness	2.80	0.64
Flexibility	2.80	0.65
Complying with requirements	2.80	0.63
Completeness of data	2.78	0.64
Security	2.78	0.64

In the future, IT use cost in terms of hardware and software should be decreased in order to encourage widely used. Moreover, the agricultural product industries should maintain system maintenance continuously. Thus, the systems always run and support information to users effectively.

Nowadays, agricultural product industries use IT in businesses in three major operational segments: 1) material procurement, 2) production, finance sales, and human resource management, and 3) shipping. These organizations use IT in terms of logistics in 6 sub-systems: planning and scheduling system, strategic

supply system for supply chain, warehouse management, warehouse prediction, planning and production control, and transportation planning and distribution.

Internet, Enterprise Resource Planning (ERP), and e-commerce were applied to use in their businesses. However, business organizations were experiencing problems with technology in terms of virus, no internet signal, outdated computers, delays in data communication, expensive modern computer hardware, and IT staff shortage, which affected the problems of IT use for SCM and logistics.

In the future, these organizations should use RFID instead of barcode systems because RFID can store more details of information. In addition, they should be encouraged sales and marketing through their websites and social network. However, IT supporting system should be easy to use, can work fast, accurate and secure.

CONCLUSION & DISCUSSION

Results of the study will be discussed guideline for IT use for SCM and logistics in agricultural product industry in the following aspects, as shown in Figure 2.

- The improvement of IT infrastructure and powerful computer network; they should use up-to-date technology which can support large amounts of data, especially for communication system via mobile phones application. This allows users to access information quickly and easily, and keep up with the demand, anywhere and anytime.
- The integration of data creation, storage, sharing and use of raw materials, production, sales and logistics between business partners; each organization

should provide useful information to share effectively by using modern technology such as data warehouse, data mining, ERP, Global Positioning System (GPS), Online Analytical Processing (OLAP), and groupware.

- The development of human resources in terms of IT knowledge and computer skills for SCM and logistics in order to accommodate the growth in trade liberalization in future; the organizations should encourage training for their staffs to develop skills in the areas of information systems, SCM and logistics. So that employees can use the system to their advantage fluently.
- The development of adequate system security in order to protect the system; the organizations should maintain adequate security, so that the system can be used accurately and information does not leak out. This will help the organizations have advantage and competitiveness in sustainable business.

Researcher's suggestions from this study were as follows:

- The further study of IT use for SCM and logistics in agricultural product industry in Nakorn Pathom province should be compared to areas on other provinces of Thailand that there is any difference or not
- The further study of IT use for SCM and logistics in agricultural product industry should be compared to other industry groups.

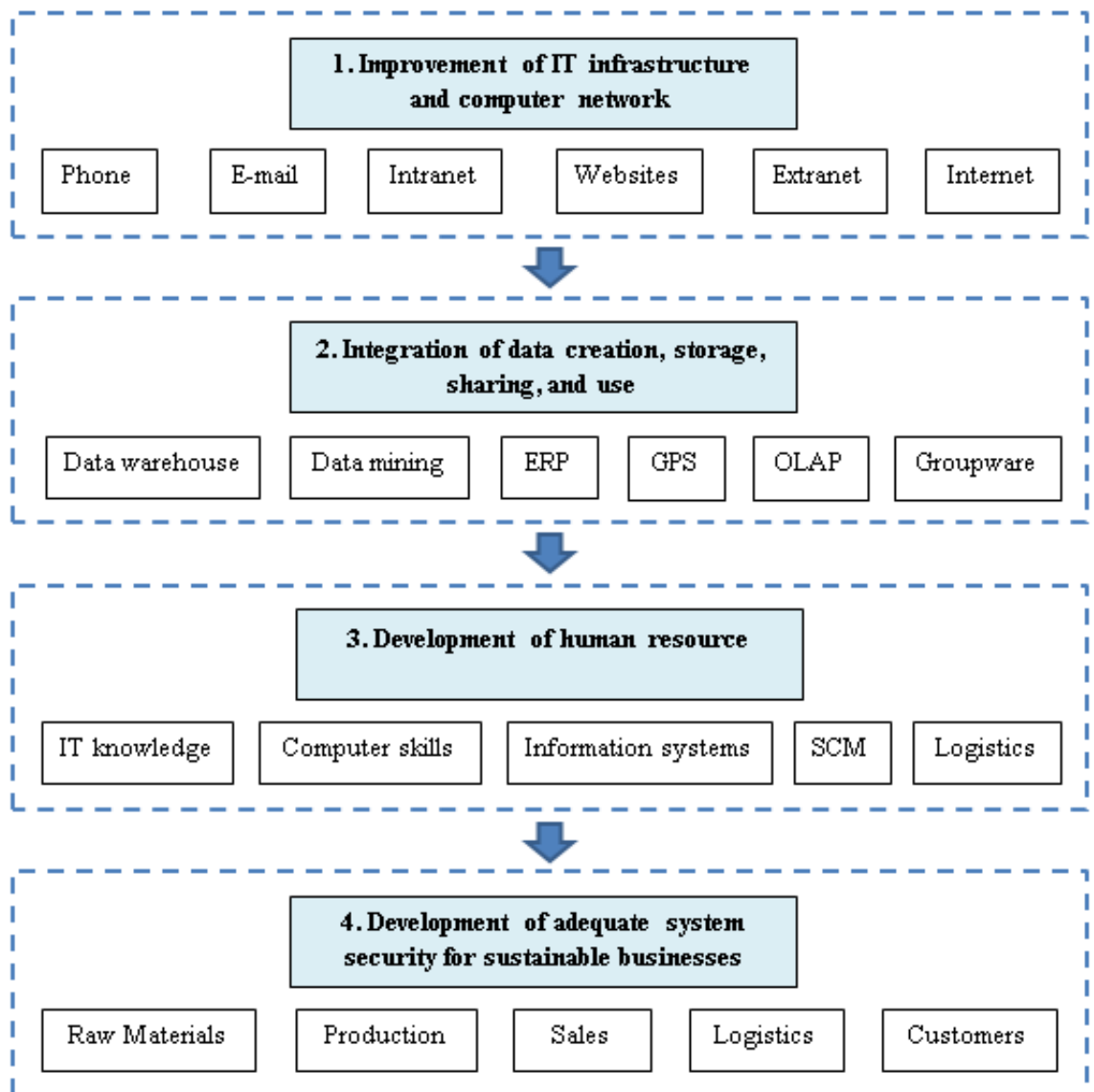


Figure 2: Guideline for IT use for SCM and logistics in agricultural product industry.

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