Chapter 3

Methodology

3.1 Introduction

The scope of this research includes stakeholders, products, processes and activities. The knowledge map is the theory to support this research. Additionally, the researcher collected explicit knowledge by literature review and collected tacit knowledge by interviewed experts. First of all, the research confirms the scope of the coffee supply chain by doing the literature review. Then, the researcher analyzed the relationship among stakeholders, products, processes, and activities. After that, risk analysis and Pareto chart are used to evaluate risk a priority. Moreover, the researcher acquired critical knowledge from priority of risk activities. Additionally, the researcher validated critical knowledge by interviewed experts. At last, researcher design data dictionary to be a traceability data structure. There are 6 steps below:

1) Overview a supply chain of coffee
2) Data collection
3) Data analysis
4) Knowledge map
5) Validate critical knowledge
6) Design data dictionary

3.2 Conceptual Framework

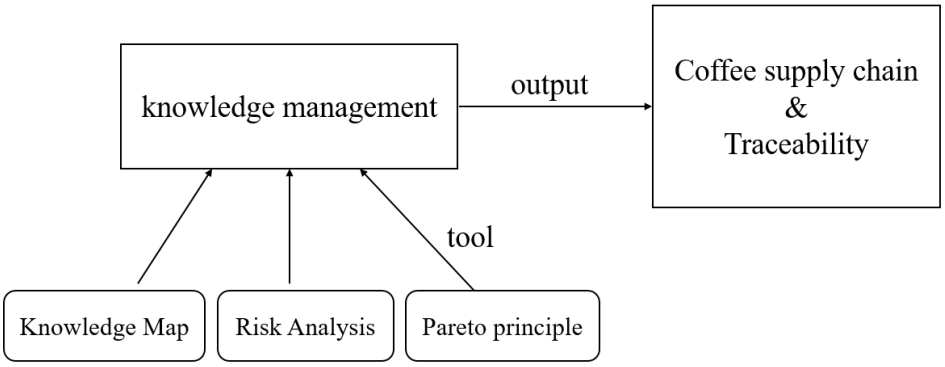

Figure 3.1 Conceptual framework

This research uses three theories of knowledge management: knowledge map, risk analysis and Pareto principle to analyze the coffee supply chain and traceability.

3.3 Details of Methodology

In this research, all procedures, theories, tools, and the output of each step can be shown in Table 3.1.

Table 3.1 Research procedure

Steps	Theory& Tools	Output/Outcome
1.Overview a supply chain of coffee	Literature review Supply chain concept	Explicit knowledge survey
2.Data collection	Interview expert	The relationship among the stakeholders, products, processes and activities in coffee supply chain.
3.Data analysis	Risk Analysis Pareto Chart	Risk evaluation Risk priority
4.Knowledge represent	Mind map	Critical knowledge
5.Knowledge validation	Expert validation	Knowledge approval
6.Design data dictionary	Design database	Data dictionary

There are 6 procedures. The first step is confirming the scope of coffee supply chain. The second step is data collection. Interviewing the experts acquire the relationship among the stakeholders, products, processes and activities in the coffee supply chain. The third step is data analysis, using risk analysis to evaluate the risk of each activity and distinguish risk priority by using the Pareto chart. The fourth step is critical knowledge presentation by using a knowledge map. This critical knowledge comes from the priority of risk activities acquired from the previous step. The fifth step is validating critical knowledge, the researcher interview experts to check the correctness of critical knowledge and traceability information. The last step is design data dictionary.

3.4 Overview a Supply Chain of Coffee

Based on chapter 2, there are many complex activities in the coffee supply chain. In general, the coffee supply chain includes the processes from coffee cultivating to consumption. There are many processes involved from upstream to downstream in the coffee supply chain. To scope the coffee supply chain, the researcher focus on related stakeholders, products, processes and activities along the coffee supply chain. The researcher mainly collects explicit knowledge from literature review, which also includes academics paper, journal, book and website.

3.5 Data Collection

3.5.1 Primary Data

To ensure the correctness of coffee stakeholders, products, processes, activities and critical knowledge involved in the research process, the researcher interviewed four experts. They are experts from different fields of the coffee industry and are all involved in the Lanna Thai coffee hub project. The four experts are:

1) Mr.Daecho Chaitub, Managing director of social enterprises Chiang Mai Co., Ltd. (นายเดโช ไชยทัพ กรรมการผู้จัดการวิสาหกิจเพื่อสังคม ประชารัฐรักสามัคคีเชียงใหม่ จำกัด)

2) Researcher who comes from Postharvest Technology Research Center, Faculty of agriculture, Chiang Mai University (ดร.ณัฏฐวัฒณ์ หมื่นมาณี นักวิจัย ศูนย์วิจัยเทคโนโลยีหลังการเก็บเกี่ยว คณะเกษตรศาสตร์ มหาวิทยาลัยเชียงใหม่)

3) Coffee business owner of Dibosco Company

4) Naruemon Taksa-Udom, Managing director of Hillkoff

3.5.2 Secondary Data

1) Academics paper, journal and book

2) Leaflet, website, infographic

3.5.3 Data Collection Tool

The researcher acquired tacit knowledge by interviewing four experts in different fields of Thai coffee industry. The reason for choosing these four experts is that they are also involved in the Lana Thai Coffee hub project.

3.5.4 Data Collection Method

In the process of achieving an overview of the coffee supply chain, the researcher collected explicit knowledge from literature and websites. On the other hand, in order to collect tacit knowledge, the researcher interviewed four coffee experts. The purpose of the interview is to acquire tacit knowledge from experts in different fields in each research process. In this step, the way to get the relationship among the stakeholders, products, processes and activities in the coffee supply chain is interview an expert. Researcher plan to interview the Managing director of social enterprises Chiang Mai Co., Ltd.

3.6 Data Analysis

Based on the data collection, the researcher will analyze data in order to get priority of risk activities. In this process, the researcher uses risk analysis as a tool to evaluate each activity in the coffee supply chain. Then, the researcher uses Pareto to get priority of risk activities.

The first step, the researcher use risk analysis to evaluate each activity. The specific method is using the risk matrix 5x5 standard to measure the risk priority number of each activity in the coffee supply chain. Risk matrix has 2 dimensions, there are likelihood and consequence. The likelihood is used to evaluate the likelihood of failure. The consequences are used to evaluate the severity of the impact. The likelihood is divided into five grades. According to the possibility of occurrence, it is assigned 5-1 points from high to low. There are almost certaintain5 points, likely 4 points, possibly 3 points, unlikely 2 points and rare1 points. In consequence, trivial, minor, moderate, major and severe are given 1-5 points according to the severity of consequence. Multiplication of likelihood and consequence is called risk priority number.1-25 point for risk priority number presents risk level from lowest to highest. In other words, the higher the score, the higher the risk. In order to ensure the corrects evaluation of the risk priority number. The researcher interviewed two experts. They are the researcher from Post-Harvest Technology Research Center, Faculty of Agriculture, Chiang Mai University and coffee business owner of Dibosco company.

The second step is used Pareto as a tool to get prioritize of risk in the coffee supply chain. The specific method is to calculate the cumulative percent of each activity based on risk priory number. Then, the researchers collected activities with a cumulative percentage of the first 80% as the critical risk. Then, these risks are used to draw Pareto charts and rank them from high to low according to the number of risk priory number.

3.7 Knowledge Map

In this step, the researchers acquire critical knowledge by analyzing critical risks. Moreover, showing this critical knowledge by using a knowledge map. This knowledge map does not only show the critical knowledge but also show clearly the relationships among stakeholders, processes and activities involved in the coffee supply chain.

3.8 Validate Critical Knowledge

Based on the acquired critical knowledge, the researcher collects related traceability information among the stakeholders in the coffee supply chain. To ensure that the correctness of critical knowledge and traceability information can be traced in the coffee supply chain. The researcher interviews the managing director of HillKoff.

This interview focuses on the information of stakeholders and products that can be traced in the coffee supply chain. Additionally, this traceable information could be useful that consumers want to know or care about it. Of course, this information can be traced to the real coffee supply chain. This step is very necessary. Because the purpose of expert validation is to ensure the authenticity, correctness and reliability of critical knowledge and traceability information.

3.9 Design Data Dictionary

According to the results of interviews with an expert, the traceability information that should be collected must cover stakeholders and products in the coffee supply chain. When designing a data dictionary, first of all, the traceability information should cover the stakeholders and products. Secondly, each traceability information must have field name, data type, data format, field size, description and example. The purpose is to standardize content and define the categories and traceability information for technology engineers are easy to design databases.