

IMPROVEMENT OF USED SHOES SUPPLY CHAIN BY REVERSE LOGISTICS AND LEAN CONCEPTS

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ABSTRACT

Purpose: To review and investigate the value chain of used shoes in Thailand, and to propose a framework for improvement.

Design/methodology/approach: The methodology of this study is divided into four steps. Firstly, used shoes supply chain in Thailand is surveyed and reviewed. Its value chain is then analyzed whose added values in the chain are identified. Subsequently, value stream mapping (VSM) is employed to define and analyze the supply chain processes where unnecessary activities are discovered. Finally, an improvement framework based on reverse logistics and lean concepts where procedures in the chain are adjusted is proposed.

Findings: Conditions and procedures of Thailand's used shoes supply chain are overviewed. Present activities which are either value added, necessary but non-value added, and non-value added are identified. Supply chain of used shoes in Thailand can be improved using simple industrial management concepts.

Research limitations/implications (if applicable): In this study, data collection is performed using observation and interview approach only at Rong Kluea Market. There is no previous study regarding used shoes supply chain.

Practical implications (if applicable): This study can be used as a guideline for entrepreneurs to adjust their procedures in order to reduce cost and time as well as to increase customer satisfaction. Moreover, the techniques adopted here in this work should be practical to other recycled products.

Originality/value: Supply chain of used shoes is considered for the first time, especially in Thailand setting. The case study is extremely useful for other recycled products.

Keywords: Shoes industrial, Used Shoes Supply Chain, Rong Kluea Market, Sakaeo

Introduction

In any declining economy, spending habits of consumers are changing. The consumers will tend to spend more carefully. Consumers may look towards second hand markets. Second hand market is the market of choice to help consumers save their money. It is the place where people will sell used goods such as clothes, bags, accessories, books, decorations and etc. Used goods are popular if they are generally in good quality and low price. Nowadays, this term of retail is accepted and shows signs of expansion. In Thailand, there are many second hand markets, for example; Chatuchak market, Wang Lang market, Klong Thom market, Train market Srinakarin etc. One of the biggest second hand markets in Thailand is Rong Kluea market located in Sakaeo near Thai-Cambodia border approximately 360 km from Bangkok. This market is popular for Thai people, tourists and sellers. Rong Kluea market can be considered a retailer and wholesaler.

There are several materials and processes involved which are driving the production process for sandals and specialized shoes. Therefore, in terms of operational activities, they might be different. This industry is growing. The demands and the competitors of these products are increasing. The product cycle is relatively short. With the rapid changes in market place and fashion, consumer trends might lead to a higher level of post-consumer waste. Worn and discarded (end-of-life) shoes are disposed of, despite their remaining market values.

In Thailand, there are imported used shoes from other countries through Laemchabang port located in Southern Bangkok which are forwarded to Rong Kluea Market for reselling. The process flow of the selling chain is of great interest. The middlemen who import used shoes sell them to merchants in Dech Thai market (Sub-market of Rong Kluea market). The merchants are classified into 3 groups by grade and price of products that they selected. Used shoes are put into the processes following; separating, selecting, washing, repairing and coloring. Subsequently, the shoes are resold with retail and wholesale price. Generally, all products in this chain are used shoes and consumers are interested in buying them, because they contain brand name which have lower prices than new shoes.

This study focuses on reviewing used shoes supply chain for analysis of the value chain and processes. Value added of used shoes was investigated. The processes will be analyzed and defined using Value Stream Mapping (VSM) to reduce unnecessary activities. Finally, improvement based on reverse logistics and lean concepts are suggested to minimize supply chain cost.

Literature Reviews

There have been very few studies on the used shoes supply chain, hence the reason for this study. The scope of this paper is related to the review of the used shoes supply chain and to understand the value added in the chain by means of value chain analysis.

The previous studies are reviewed in 3 main categories. Firstly, this study will look at a review recovery process in the chain (Why this process is important in chain). After, value strategies are described. Lastly, this research will look at the footwear industry.

This section aims to describe some of the key concepts in understanding why the business organizations are interested in recovery products. In addition, how companies add value to their products. Finally, waste management in the footwear industry is analyzed.

End-of-life Strategies

Previous studies have reported that several business organizations are concerned about the environmental impact of the products during the final disposal process. Businesses attempt to create appropriate procedure to reduce waste at products' end-of-life cycle. Pigosso, et al. (2010) introduced eco-design concept which focused on remanufacturing. They concentrated on products' end-of-life as a part of product life cycle. The End-of-life strategy includes processes such as; reuse, repair, refurbishment/reconditioning, remanufacture and recycling. This concept tries to close the loop, minimizing environmental impact and cost of life cycle manufacturing processes. The following definitions for these terms are used in this study:

Reuse is process of used materials, products or components by second customer without prior repairing or as originally designed (Rathore, et al., 2011).

Repair is the process of bringing damaged components or items back to a functional condition (Rathore, et al., 2011).

Refurbishing/Reconditioning is the process of retrieving components to a functional state to the original specification. For example: repainting, reconstruction and etc. (Rathore, et al., 2011).

Remanufacturing is the process collecting used products or components, assessing its condition, and replace worn, broken or obsolete parts with new or refurbished part (Pigosso, et al., 2010)

Recycling is the process taking used products, components and materials to fieldstrip, separate into categories and processing them to make the same material or useful degraded material (Pigosso, et al., 2010; Rathore, et al., 2011).

Nowadays, numerous business organizations intend to follow up the End-of-life strategies, because they believe it can reduce their business cost and waste in processes. Moreover, it can help to decrease environmental impact. Therefore, they try to add value to the recovery products and

complete processes in short time. End-of-life strategies use in many businesses extensively especially in electronic equipment, automobile industries, mobile phone industries, returnable packaging etc. For example, Subramoniam et al., (2010) presented an aftermarket remanufacturing strategic planning decision-making framework where the survey were conducted in 3 target groups of automotive aftermarket. The survey samples were Original Equipment (OE), Original Equipment Service (OES) and Independent Aftermarket (IAM). End-of-life strategies of mobile phones are studied in many areas such as India, Hong Kong and United Kingdom (Rathore, et al., 2011; Chan and Chan, 2008; Canning, 2006; Geyer and Blass, 2010). During the research carried out on mobile phones reuse and recycling, the authors surveyed supply chain components, market structure and economy scale of these products. In addition, they focus on product life cycle of a typical mobile phone. Lastly, they show how mobile phones currently move through the value chain and the important of recovery markets in this moment. Returnable packaging model may be modified from disposable packaging. Silva, et al., (2012) presented a case study on the reverse flow of returnable packaging to replace a disposable packaging. They followed in three steps. Firstly, reverse logistics flow mapping was shown. Technical analysis was then used to define the type of returnable package. A technical analysis was used to compare unit cost with returnable packaging and disposable packaging. Finally, Life Cycle Assessment (LCA) technique, ISO 14040 standard series was adopted to correlate model of returnable and disposable packaging in term of environmental impacts.

It can be seen that majority of previous studies focused on electric industries which adopted concept of End-of-life strategies to their business. There is hardly any studies, investigating in second hand products. This study is interested in reuse, recycle, repair and refurbish of used shoes supply chain. Therefore, previous research will implement this chain.

Value Chain Strategy

At present, there are a number of highly competitive businesses. Therefore, several organizations attempt to create value in their chain. Generally, value chain is a strategy that they used for analyzing their chain from the beginning. Value Chain focuses on processes, and how inputs are changed into the outputs purchased by consumers (Porter,1985). After analysis of the value chain, companies will know added value in the chain and how they operate. Elements in Porter's value chain are divided into primary and support activities. Primary activities are inbound logistics, operations, outbound logistics and marketing/sales. Support activities are secondary activities and can drive a role in primary activities. So, there are procurement (purchasing), human resource management, technological development and infrastructure. Walters and Lancaster, (2000) reported that several businesses have value chain process in details more than porter's model, such as The bluegum group, automotive industry, The Mckesson Corporation, The Caterpillar and The freedom furniture. Each of them has some differences in the model. Customers today have more selection of products and services than ever before, but they are not entirely satisfied (Pralhad and Ramaswamy, 2004). The concept of co-creation is presented to combine the firm, the market and the consumer together. In 2004, Prahalad and Ramaswamy, compared concept with no co-creation and co-creation. Co-creation increases interaction between the firm, the market and the consumer. For example, they are joint problem definition and problem solving. For this reason, this concept creates experience variety and then aggregate into one idea. Problems may be resolved directly according to the customers need. As a consequence, co-creation is an interesting practice in value creation. Value chain is not specified for the business chain. It can be used to analyze network value by defining value linkages of players in the network (Peppard and Rylander, 2006). Fashion industry is an interesting sector because it has rapid change with demand driven. Fashion supply chain concerns on lead times, time to market, time to serve and react. Today, fashion market is extremely competitive and need to modernize product all the times. So, if they can shift into an agile supply chain and can forecast the demand, their cost will reduce (Christopher, et al., 2004).

Value Stream Mapping (VSM) is a tool for reviewing the overall processes. Start from creation of current state mapping. Analysis and defining processes are then sorted into three categories; non-value adding (NVA), necessary but non-value adding (NNVA) and value-adding (VA). Subsequently, procedure is created to eliminate seven wastes in systems which are overproduction, waiting, transport, inappropriate processing, unnecessary inventory, unnecessary motion and defects. Finally, creation of future state mapping is performed to adjust process. The expected result includes

minimizing time and cost in chain (Hines and Rich, 1997). The VSM concept is considered as a significant tool in the improvement stage of this research.

Waste Management in Footwear Industry

The footwear industry is part of the overall fashion industry. In recent years, demands and competition in this industry has rapidly increased. Life cycle of shoes is short, leading to a higher level of waste in end-of-life. Despite this, very few studies have investigated the impact of waste on environment. Staikos and Rahimifard (2007) aimed to create an optimal method for waste management in footwear industry. They presented a decision-making model using analytic hierarchy process (AHP), which is a multi-criteria decision-making (MCDM) method. Normally, shoes waste management model consists of four options in end-of-life which are reuse, recycling, energy recovery and disposal. As a result, they develop a general model to an appropriate model. In addition, they try to use an associate software tool to support the decision-making model. Their research provided the optimal model for waste management process to represent responsibility for environmental and help the company to reduce cost in waste disposal process. However, this research focuses mainly on reuse, repair, recycle and refurbish of used shoes.

Research Methodology

This study starts from reviewing the used shoes supply chain by survey and review. Subsequently, interview of stakeholders in the chain will assist in obtaining more details. After that, value chain and value added are analyzed. Value Stream Mapping (VSM) is then employed to define and analyze the supply chain processes. Finally, suggestions are provided for improving the used shoes supply chain based on reverse logistics and lean concepts. The methodology of this study can be described as follows;

Preliminary Data Collection

This section is a review on the used shoes supply chain from secondary databases and documents for understanding this chain briefly. Survey of the chain and interview of stakeholders in the chain are then performed.

Value Chain and Value Added Analysis

Value chain analysis starts from analyzing activities which occur. Two categories are identified which are; primary activities and support activities. Finally, value added of the used shoes is focused by looking at value change in each step in the chain

Process Analysis

Value Stream Mapping (VSM) is used to define and analyze processes. Processes are identified into three categories; value added activities (VA), necessary but non-value added activities (NNVA) and non-value added activities (NVA). This step will enable the researcher to find the waste in these processes

Discussion and Report

This step will give some suggestion and concepts to help improving the process, after implementation and reporting.

Results

Overview of The Used Shoes Supply Chain

Rong Kluea market is located in Sakaeo, near Aranyaprathet border. There are 5 sub-markets including Old Rong Kluea market, Golden Gate market, Dech Thai market, Thesaban II (New- Rong Kluea market) and Benjawan market. Each market can be divided into specialty markets. For example, Golden gate market sells new and second hands items; Benjawan market sells second hands clothes and accessories, and Dech Thai market is specific to used shoes.

The used shoes supply chain start from middleman in Dech Thai market who import used shoes from other countries such as Korea, Hong Kong, China through Laemchabang port in approximately 45 containers per month. Middleman sells used shoes to 3 groups of merchants at Dech Thai market. After modifying processes used shoes are resold to tourists and merchants from province. Finally, used shoes are distributed to other second hand markets. The overviews of the used shoes supply chain in shown in Figure 1

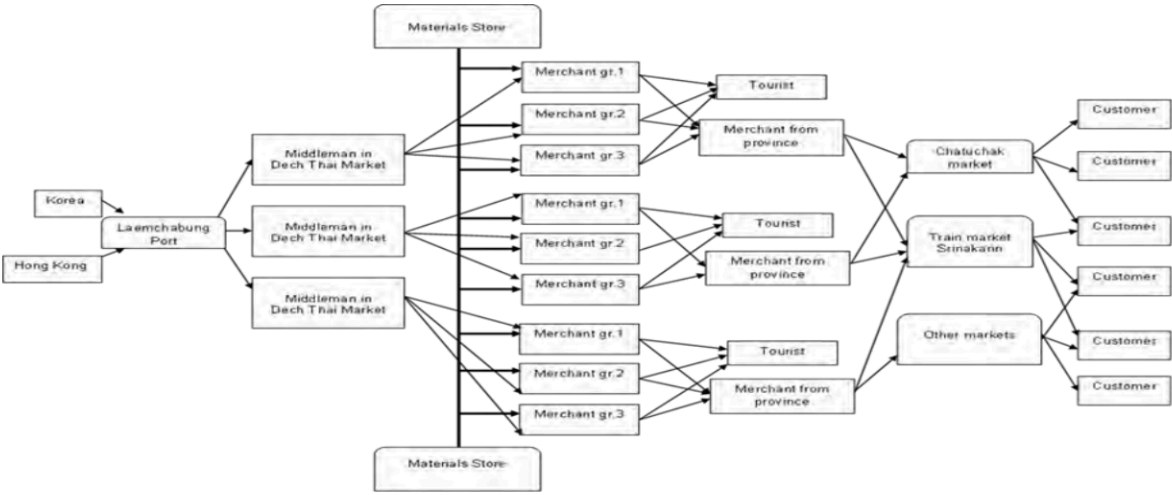


Figure 1: Used shoes supply chain

Value Chain Analysis

Value chain analysis aimed at finding value added activities in supply chain for understanding current concept. Nowadays, stakeholders try to create several activities for supporting their business. Table1 illustrate the used shoes value chain analysis. From this section, know what the activities stakeholders use to added value in the chain.

Primary Activity	Supply Chain's Activities	Advantages
1. Inbound Logistics	1.1 Import used shoes from aboard 1.2 Transportation Lamchabung > Dech Thai market Dech Thai market > Other markets 1.3 Dispense parts of shoes to labors	1.1 Get original brand name which have good quality 1.2 Transportation make the processes in supply chain drive and help to distribute goods to other provinces 1.3 Increase responsiveness of customers need
2. Operations	2.1 Separating 2.2 Selecting 2.3 Soles repairing 2.4 Washing 2.5 Repairing 2.6 Ornamenting heeled shoes & Painting	2.1 Easy to selecting 2.2 Can select used shoes in grade and price as they need 2.3 Repairing, washing, Ornamenting heeled shoes and painting are processes to added value for this products cause its make used shoes to durable and similar as new item
3. Outbound Logistics	3.1 Retail and wholesale sales	3.1 Retail is higher price but wholesale is lower price and specific to high quantity.
4. Marketing and Sales	4.1 Loyalty to customers for example;	4.1 Get customers reliability and

	Deliver goods to customers at right- time, right grade, right quantity and right place 4.2 Select used shoes in good quality for customers when they can't come to select by themself	keep business relationship 4.2 Get customers satisfaction
5. Service	5.1 Deliver for province customers 5.2 Compensate to customers in case deliver incomplete quantity	5.1 Increase number of customers 5.2 Get customers reliability and keep business relationship
Support Activity	Supply Chain's Activities	Advantages
1.Procurement	1.1Provide suppliers who have good quality of used shoes 1.2Provide suppliers who have good quality and inexpensive parts/implements	1.1 Reduce waste and cost 1.2 Get high benefit and good quality of materials
2.Technology Development	2.1 Contact with suppliers on aboard by email	2.1 Reduce cost and it is a rapid communication
3.Human Resource Management	3.1 Employ skilled labors	3.1 Get exquisite and high quantity products for response the customers need
4. Firm Infrastructure	-	-

Table 1: Value Chain Analysis by Activities

Value Change in Used Shoes Supply Chain

Used shoes are imported from other countries at low prices. Cost is about 13.75 Baht/pair. The middleman sells them to 3 groups of sellers in Dech Thai market at different prices. Subsequently, sellers push them into processes for added value. Trading of the used shoes are similar to retail prices and wholesale prices depending on quantity requested by customers. Each stakeholder benefits differently (Table2). Details of value change of the used shoes supply chain is shown in Figure 2

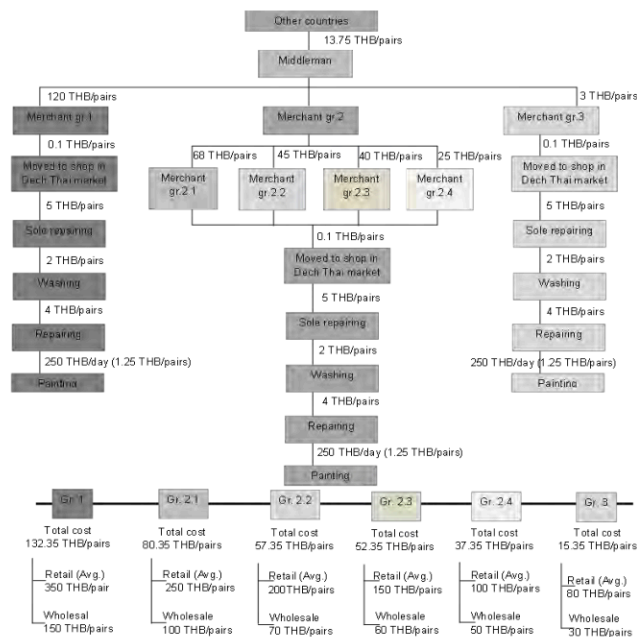


Figure 2: Cost-Benefit structure of each stakeholder

Stakeholders	Cost	Selling price (Avg.)	Margin
Middleman	13.75 THB/pairs	53.75 THB/pairs	290.09%
Merchants in group 1	132.35 THB/pairs	Retail (80%): 350 THB/pairs	131.56%
		Wholesale (20%): 150 THB/pairs	2.67%
Merchants in group 2.1	80.35 THB/pairs	Retail (80%): 250 THB/pairs	168.91%
		Wholesale (20%): 100 THB/pairs	4.89%
Merchants in group 2.2	57.35 THB/pairs	Retail (80%): 200 THB/pairs	198.98%
		Wholesale (20%): 70 THB/pairs	4.41%
Merchants in group 2.3	52.35 THB/pairs	Retail (80%): 150 THB/pairs	149.23%
		Wholesale (20%): 60 THB/pairs	2.92%
Merchants in group 2.4	37.35 THB/pairs	Retail (80%): 100 THB/pairs	134.19%
		Wholesale (20%): 50 THB/pairs	6.77%
Merchants in group 3	15.35 THB/pairs	Retail (80%): 80 THB/pairs	336.94%
		Wholesale (20%): 30 THB/pairs	19.09%

Table 2: Margin of Each Stakeholder

Value Stream Mapping

Value stream mapping is used to understand the current processes in the used shoes supply chain. The chain starts from a middleman in Dech Thai market who imports used shoes from other countries such as Korea, Hong Kong, China through Laemchabang port, approximately 45 containers per month. After paying the import duty, the used shoes are forward to warehouses in Dech Thai market. The middleman sells the used shoes to merchants in Dech Thai market who can freely select used shoes with grade and price as they need. These merchants are separated into 3 groups; Merchants in group 1 are the first selector. They can select whole goods in container; normally, they always select brand name grade as good quality. Group 2 selects goods which merchants group 1 did not select. Finally, group 3 buy used shoes in bulk. The used shoes are selected in order to be improved by washing, repairing and painting before reselling. The Value Stream Mapping of used shoes supply chain shown in Figure 3

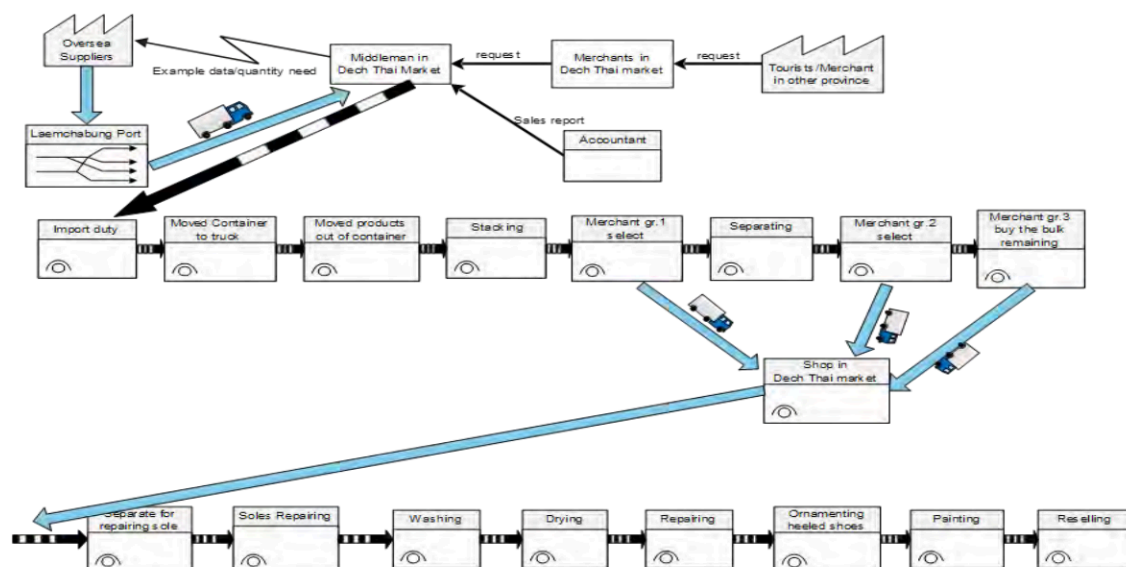


Figure 3: Current state of used shoes processes flow by using Value Stream Mapping (VSM)

Summary and Discussion

Used shoes are imported in approximately 45 containers /month (16 tons /container). Processes before reselling are sorting and repairing. Nowadays, there are no definite patterns within the supply chain. Some activities take long time to process. Moreover, there are many wastes from the imported

goods that could make a strong damage. For sellers, each pair of shoes has different prices which depending on merchantability and brands of products. Each stakeholder has similar processes but they do not get benefit equally. For further research, processes in the supply chain into 3 categories; non-value adding (NVA), necessary but non-value adding (NNVA) and value adding (VA) may be defined to eliminate non-value adding processes and to reduce processes time. So, stakeholders will get higher benefit.

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