

New services development and pricing strategy of rail transporters in Thailand

Komsan Suriya¹, Siriporn Srichochart², Kansinee Guntawongwan³,
 Mantana Thammpanyawat⁴ and Sirikool Tangarayasup⁵

^{1,3,5}*Faculty of Economics, Chiang Mai University*
¹*E-mail: suriyakomsan@yahoo.co.th*

^{2,4}*Social Research Institute, Chiang Mai University*

ABSTRACT

This study aims to find the possibility of launching new services that may be offered by the rail transporter that suit the needs of SMEs and Community Enterprises in Chiang Mai, Thailand to transport their products to Bangkok and other provinces. It also decomposes current land transportation costs. Binary choice model reveals that the most potential services are door-to-door service and over-night express transportation. The most potential target groups are SMEs in San Kampaeng district. Hedonic price model discovers the sizes of four influential factors in land transportation costs which are distance between origin and destination, weights of goods, packing service and door-to-door service.

Keywords: Rail Transportation, Small and Medium Enterprises, Community Enterprises, Binary Logit, Hedonic Price Model

JEL Classification: L92, M31, D22

1. Introduction

Rail transportation is a hope of the Thai government to reduce logistic costs for Small and Medium-Sized Enterprises (SMEs) and Community Enterprises (CEs). The cost of rail transportation is substantially lower than road transportations (Rushton, Croucher and Baker, 2006). It is one of the national master plan to create the competitive strategy to drive a country to be advantage in international market (Porter, 1980).

However, their marketing strategies are rather defensive. Major transportation service is the transportation from a railway station to another railway station. It is apparently that the rail transporter waits for customers to come to them rather than challenging itself to offer services to customers at their places.

There are needs for the proactive campaign for rail transporters to push itself toward its customer. Its supply chain strategy must be customer-driven and customer focused. An action that the rail transporter can do is to develop new service to achieve this strategy (Hines, 2004).

This study examines four new services that are potential for the rail transporter to offer to manufactures which are SMEs and CEs. The services are door-to-door service, over-night express transportation, transportation to other provinces apart of Bangkok and transportation service points near factories. It will use Binary Logit Model to investigate the decisions of SMEs and CEs to choose the new services.

Moreover, the study will decompose the price of goods transportation using Hedonic Price Model. The knowledge from this part will construct a formula that SMEs and CEs can calculate their product transportation costs which are delivered by land.

The scope of the study is bounded for the land transportation of goods between Chiang Mai and Bangkok including its vicinities. SMEs and CEs are those who produce products whose main materials are wooden.

2. Methodologies

2.1 Binary Logit Model

This study uses Binary Logit Model following the classical style of Domencich and McFadden (1975) with the modification from passenger transportation to goods transportation. The model is stated below with the definition of independent variables listed in Table 1.

$$\ln\left(\frac{\Pr(y = 1)}{\Pr(y = 0)}\right) = f(x_i' \beta_i)$$

where $y = 1$ decision to use the new service

0 decision not to use the new service

x_i = characteristics of SMEs and CEs listed in Table 1

β_i = parameters to be estimated

TABLE 1: List of independent variables in Binary Choice Model

No	Independent variables	Code
1	Time of goods transportation from factory to railway station (minutes)	RAILMINU
2	Time of goods transportation from factory to the nearest station of competitors which are road transporters (minutes)	ROADMINU
3	Dummy variable indicating the manufacturer of furniture	FURNITUR
4	Dummy variable indicating the manufacturer of wood carvings	CARVING
5	Dummy variable indicating the manufacturer of bamboo products	BAMBOO
6	Dummy variable indicating the manufacturer of wooden decorative items	DECOR
7	Dummy variable indicating the production sites at Ban Tawai (the biggest cluster of wooden products manufactures in Chiang Mai)	BANTAWAI
8	Dummy variable indicating the production sites at San Kampaeng (the biggest cluster of handicraft manufactures in Chiang Mai)	SANKAMPAENG
9	Dummy variable indicating the manufacturer who is Community Enterprises (if not, the manufacturer is SMEs)	COM_ENTER

The model will examine each new service separately. Therefore, there will be four models for door-to-door service, over-night express transportation, transportation to other provinces apart of Bangkok and transportation service points near factories. SMEs and CEs will decide to use or not to use the new service offered by the rail transporter. Then, the characteristics of those enterprises will reveal who are the potential targets for the marketing of the new services.

The marginal effect of each new service will determine the popularity of each service to SMEs and CEs. It can be calculated as follows (Judge, et al, 1998):

$$\frac{\partial \Pr(y = 1)}{\partial x_k} = \frac{\beta_k \exp(-\beta_0)}{(1 + \exp(-\beta_0))^2}$$

where

β_k = parameter of the variable whose marginal effect is calculated

β_0 = constant in the logit model

2.2 Hedonic Price Model

The model will decompose the price of land transportation including both rail and road transporters. The specification of the model is as follows:

$$C = f(\text{road}, \text{door}, \text{pack}, \text{km}, \text{kg})$$

where

- C = transportation cost
- Road = 1 road transporter
0 rail transporter
- Door = 1 availability of door-to-door service
0 unavailability of door-to-door service
- Pack = 1 availability of packing service
0 unavailability of packing service
- Km = distance from origin to destination (kilometers)
- Kg = weights of the goods (kilograms)

The hedonic price model will reveal the price settings of the currently available transportation services. It will not show the willingness to pay for any new services. This is because the data in this part are from real transportation costs that are applied to SMEs and CEs. They are not from the willingness to pay of the manufacturers.

3. Data

In Binary Logit Model, the data includes 184 SMEs and CEs whose main materials of their products are wooden. The enterprises produce furniture, wood carvings, bamboo products, wooden decorative items. Most of them are located in Ban Tawai village in Hangdong district to the South of Chiang Mai city which is the biggest cluster of wooden manufacturers in Chiang Mai. Another major location of the manufactures is San Kampaeng district to the East of Chiang Mai city which is the largest cluster of handicraft manufacturers in Chiang Mai.

In Hedonic Price Model, the data collects 125 types of land transportation offered by rail and road transporters. Differentiation of the transportation types are according to the

availability of door-to-door service, packing service, the distance from origin to destination, weights of goods and different types of land transporters.

4. Results

4.2 New Services Development

This section will report the estimation results from Binary Logit Model on each new services that the rail transporter may offer to SMEs and CEs. It will begin with door-to-door service following by the over-night express transportation, transportation to other provinces apart of Bangkok and transportation service points near factories.

4.2.1 Door-to-door service

In Table 2, SMEs in San Kampaeng district tends to use door-to-door service more than other manufacturers. This is because San Kampaeng is more familiar with rail transportation than manufacturers elsewhere. It is because San Kampaeng is located near the railway station, around 20 minutes by road. Therefore, SMEs in San Kampaeng has developed trust with rail transportation substantially. When the rail transporters offer a better option of transportation, then this group of manufactures will decide to use the new service.

TABLE 2: Estimation results from Binary Choice Model of the decision to use door-to-door service

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAILMINU	-0.0154	0.1254	-0.1229	0.9021
ROADMINU	0.2189	0.3009	0.7274	0.4669
FURNITUR	-0.9098	0.8532	-1.0663	0.2863
CARVING	1.3867	0.8593	1.6137	0.1066
BAMBOO	0.2765	0.6379	0.4334	0.6647
DECOR	-0.0940	0.6133	-0.1533	0.8781
BANTAWAI	2.5596	3.2751	0.7815	0.4345
SANKAMPAENG	1.4714	0.7410	1.9857	0.0471
COM_ENTER	-1.8294	0.8509	-2.1497	0.0316
C	-0.2903	0.8792	-0.330221	0.7412
McFadden R ²	0.0673			

Source: Estimation using Eviews

4.2.2 Over-night express transportation

In Table 3, CEs reflects negatively to the over-night express transportation. This is because the expectation of expensive fare. CEs are those micro enterprises founded by villagers to produce local foods and some local handicrafts. Their scales of operation as well as profit are small. Therefore, they cannot afford the expensive cargo cost. They also need not such rapid transportation. They rely heavily on the marketing events organized by government agencies from time to time. Thus, they need not to deliver products regularly to customers in Bangkok or other provinces.

In contrast, the negative sign indicates that SMEs reflects to this service positively. This is because the variable Com-enter is a dummy variable indicates CEs as one and SMEs as zero. SMEs need this rapid service to be advantageous in winning customers in Bangkok and its vicinities where high market values are awaiting.

TABLE 3: Estimation results from Binary Choice Model of the decision to use over-night express transportation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAILMINU	0.1116	0.1616	0.6909	0.4896
ROADMINU	-0.1144	0.3726	-0.3069	0.7588
FURNITUR	0.2451	1.2368	0.1981	0.8429
CARVING	0.7700	1.0014	0.7689	0.4419
BAMBOO	-0.0508	0.7201	-0.0705	0.9438
DECOR	-0.7711	0.6933	-1.1121	0.2661
BANTAWAI	-0.9754	4.0964	-0.2381	0.8118
SANKAMPAENG	0.7791	0.7650	1.0183	0.3085
COM_ENTER	-1.7102	0.8576	-1.9940	0.0461
C	1.3083	1.0218	1.280341	0.2004
McFadden R ²	0.0972			

Source: Estimation using Eviews

4.2.3 Transportation to other provinces apart of Bangkok

In table 4, only enterprises in San Kampaeng district reflects positively to the transportation to other provinces apart of Bangkok. This is because there are varieties of products in the location. San Kampaeng is the biggest cluster of manufacturers of handicrafts. Just only Bangkok may not be enough to absorb all kinds of goods produced in this location. Therefore, enterprises in San Kampaeng may seek to sell and deliver goods to other provinces to customers in other provinces.

TABLE 4: Estimation results from Binary Choice Model of the decision to use the transportation to other provinces apart of Bangkok

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAILMINU	0.0581	0.1103	0.5272	0.5980
ROADMINU	0.0122	0.2593	0.0473	0.9622
FURNITUR	-0.0639	0.8433	-0.0757	0.9396
CARVING	0.6202	0.6789	0.9135	0.3609
BAMBOO	0.4201	0.6177	0.6802	0.4963
DÉCOR	-0.4382	0.5671	-0.7727	0.4397
BANTAWAI	0.2783	2.8314	0.0982	0.9217
SANKAMPAENG	1.3174	0.6454	2.0412	0.0412
COM_ENTER	-1.1003	0.6920	-1.5899	0.1119
C	-0.1753	0.7888	-0.2222	0.8241
McFadden R ²	0.0674			

Source: Estimation using Eviews

4.2.4 Transportation service points near factories

In table 5, enterprises in San Kampaeng district is again the target customers of transportation service points near factories. The reason is that the daily transaction sizes of their businesses are enormous. Therefore, they need not to travel further to drop their products. When the rail transporters has been trusted by this cluster of manufactures for long time, and when it offers the nearer dropping points, then enterprises in San Kampaeng will be delighted to use the service.

TABLE 5: Estimation results from Binary Choice Model of the decision to use transportation service points near factories

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAILMINU	-0.0981	0.1295	-0.7570	0.4490
ROADMINU	0.4018	0.3143	1.2783	0.2011
FURNITUR	-0.4056	1.0226	-0.3967	0.6916
CARVING	0.9183	0.9178	1.0005	0.3170
BAMBOO	-0.4743	0.7216	-0.6572	0.5110
DECOR	-0.7533	0.6909	-1.0903	0.2756
BANTAWAI	4.0329	3.3642	1.1987	0.2306
SANKAMPAENG	1.2621	0.7346	1.7181	0.0858
COM_ENTER	-1.4209	0.8978	-1.5826	0.1135
C	0.0994	0.9446	0.1052	0.9162
McFadden R ²	0.0667			

Source: Estimation using Eviews

4.2.5 Marginal effects of the new services

Door-to-door service is a powerful tool for private transporters to gain popularity among SMEs and community enterprises. The service will increase the probability of choosing rail transportation over road transportation by 46% compared to the base case (Table 6). The service helps entrepreneurs reduce their burdens in driving to downtown. However, the driving cost is paid in the form of service charge instead.

An over-night express transportation is the second popular service, increasing the probability by 43% for SMEs. The third popular service goes to the transportation to other provinces out of Bangkok, increasing the probability of 33% for enterprises in San Kampaeng district. The fourth popularity belongs to the establishment of the transportation service point near factories which creates an increasing probability of 32% for manufacturers in San Kampaeng.

TABLE 6: Marginal effects of the new services to the probability of choosing rail transporters over road transporters to deliver goods

No.	New services of rail transporters	Target customers	
		SMEs	Enterprises in San Kampaeng
1	Door-to-door service	Increasing probability of 46%	Increasing probability of 37%
2	Over-night express transportation	Increasing probability of 43%	Unchanged probability
3	Transportation to other provinces apart of Bangkok	Unchanged probability	Increasing probability of 33%
4	Transportation service points near factories	Unchanged probability	Increasing probability of 32%

Source: Calculations compared to base case which all independents are zero.

4.2 Price Decomposition

The Hedonic Price Model in Table 7 shows that door-to-door service costs 85 Baht (around USD2.64 or €1.74) per piece (around 30 kilograms).

TABLE 7: Estimation results from Hedonic Price Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DOOR	85.4751	8.0959	10.5578	0.0000
PACK	143.6972	3.0989	46.3703	0.0000
KM	0.9448	0.0209	45.1497	0.0000
KG	4.6689	0.0947	49.2927	0.0000
C	-175.2294	4.7909	-36.5751	0.0000
Adjusted R ²	0.9842			

Source: Estimation using Eviews

Packing service costs 144 baht per piece (around USD4.36 or €2.88). One additional kilometer costs 0.94 Baht (around USD0.03 or €0.02). One additional kilogram costs 4.67 Baht (around USD0.14 or €0.09).

Unfortunately, the model cannot capture the effect of the difference between rail and road transporters. The model suffers from serious multicollinearity problem between variables ROAD and DOOR; the correlation is 0.9681. Then it must choose drop variable to correct the problem. Although both variables are extremely important, the study chooses to keep the variable DOOR because of the linkage to the new services development strategy.

It also should be noted that the model suffers from autocorrelation problem. It uses Cochrane-Orcutt method for the remedy. Consequently, the value of the constant term changes from -811 to -175. To use the model to calculate the transportation cost, SMEs and CEs must use the value -811 as the constant term.

5. Concluding remarks

This study tries to help rail transporter to offer right services to manufacturers who produce wooden products in Chiang Mai, Thailand. The main purpose is to test who are target groups of four new services; door-to-door service, over-night express transportation, transportation to other provinces apart of Bangkok and transportation service points near factories. Moreover, the study decompose the transportation costs to investigate the influence of the availability of some services including to the transportation process and some factors such as distance and weights of the goods.

The study discovers that SMEs in San Kampaeng district are a potential target group for most of new services that may be offered by the rail transporters. Major reasons are that they are located near the railway station, they has developed trust in using rail transportation for long time, their sizes of daily transaction are huge and their varieties of products are wide.

The decomposition of current transportation costs reveals that the door-to-door service costs 85 Baht (around USD2.64) for a piece of product weighted around 30 kilograms. One additional kilometer costs 0.94 Baht (USD0.03). One additional kilogram costs 4.67 Baht (USD0.14). Finally, packing service costs 144 Baht per piece (USD4.36). The constant term which is not affected by autocorrelation problem is -811 Baht (USD24.55). SMEs and CEs can estimate their transportation costs using this formula.

REFERENCES

- Domencich, Thomas and Daniel McFadden. 1975. **Urban Travel Demand: A Behavioral Analysis**. New York: American Elsevier.
- Hines, Tony. 2004. **Supply Chain Strategies: Customer-Driven and Customer-Focused**. Oxford: Elsevier.
- Judge, George et al. 1988. **Introduction to the Theory and Practice of Econometrics**. 2nd ed. New York: John Wiley & Son.
- Porter, Michael. 1980. **Competitive Strategy**. New York: Free Press.
- Rushton, Alan, Phil Croucher and Peter Baker. 2006. **The Handbook of Logistics and Distribution Management**. 3rd ed. London: Kogan Page.