

Consumers' Satisfaction on Marketing Mix of Biodiesel in Southern Thailand: A Case Study in Songkhla, Krabi, and Trang Provinces

Purawich Phitthayaphinant and Ayut Nissapa

ABSTRACT

Energy from petroleum-based sources is considered scarce. Therefore, biodiesel is an alternative energy source for Thailand to develop its economy in order to meet continuously increasing energy demands. This study was conducted to primarily analyze consumers' socioeconomic characteristics and their satisfaction on marketing mix of biodiesel in Southern Thailand using a case study in Songkhla, Krabi, and Trang provinces. Factors affecting their satisfaction were also determined. Data were collected using structured questionnaires from a total sample of 303 biodiesel consumers, 101 observations per province. These samples were selected using quota technique. Descriptive statistics and seemingly unrelated regression were applied for data analysis. It was found that the sampled consumers were highly satisfied with the biodiesel products and prices. They were moderately satisfied with selling place and product promotion. The statistically significant variables determining; 1) consumers' satisfaction on the biodiesel product were their assigned importance to biodiesel product availability, their price and places of sale, and consumers' expenditure on biodiesel; 2) consumers' satisfaction on biodiesel price were their assigned importance to prices and places of sale, and consumers' expenditure on biodiesel; 3) consumers' satisfaction on biodiesel place were their assigned importance to places of sale and product promotion; and 4) consumers' satisfaction on biodiesel promotion were their assigned importance to prices and product promotion, and consumers' expenditure.

Keywords: consumers' satisfaction, marketing mix, biodiesel, Southern Thailand

บทคัดย่อ

อุปสงค์พลังงานกระแสหลักจากปิโตรเลียมได้เพิ่มขึ้นอย่างต่อเนื่อง แต่ในขณะเดียวกันพลังงานดังกล่าวกลับมีอยู่อย่างจำกัดบนโลกใบนี้ ทำให้ไบโอดีเซลกลายเป็นแหล่งพลังงานทางเลือกที่สำคัญเพื่อการพัฒนาเศรษฐกิจของประเทศไทย การศึกษาครั้งนี้จึงมีวัตถุประสงค์เพื่อศึกษาลักษณะทางเศรษฐกิจสังคมของผู้บริโภคไบโอดีเซล รวมถึงความพึงพอใจของผู้

บริโภคต่อส่วนประสมทางการตลาดของไบโอดีเซล และปัจจัยที่มีผลต่อความพึงพอใจของผู้บริโภคต่อส่วนประสมทางการตลาดของไบโอดีเซลในภาคใต้ของประเทศไทย กรณีศึกษาจังหวัดสงขลา กระบี่ และตรัง โดยใช้แบบสอบถามแบบมีโครงสร้างในการเก็บรวบรวมข้อมูล จากกลุ่มตัวอย่างผู้บริโภคไบโอดีเซลจำนวนทั้งสิ้น 303 ราย ซึ่งแบ่งเป็นรายจังหวัด ะละ 101 ราย และทำการเลือกตัวอย่างแบบกำหนดสัดส่วน การวิเคราะห์ข้อมูลใช้สถิติเชิงพรรณนาและ

การวิเคราะห์การถดถอยที่เสมือนว่าไม่มีความสัมพันธ์กัน ผลการศึกษาพบว่า ผู้บริโภคไบโอดีเซลมีความพึงพอใจต่อปัจจัยส่วนประสมทางการตลาดด้านผลิตภัณฑ์และราคาในระดับมาก ในขณะที่พึงพอใจต่อปัจจัยส่วนประสมทางการตลาดด้านช่องทางการจัดจำหน่ายและการส่งเสริมการตลาดในระดับปานกลาง ปัจจัยที่มีผลต่อความพึงพอใจของผู้บริโภคต่อส่วนประสมทางการตลาดด้านผลิตภัณฑ์ คือ ระดับความสำคัญของปัจจัยด้านผลิตภัณฑ์ ด้านราคา ด้านช่องทางการจัดจำหน่าย และค่าใช้จ่ายในการบริโภคไบโอดีเซล ปัจจัยที่มีผลต่อความพึงพอใจของผู้บริโภคต่อส่วนประสมทางการตลาดด้านราคา คือ ระดับความสำคัญของปัจจัยด้านราคา ด้านช่องทางการจัดจำหน่าย และค่าใช้จ่ายในการบริโภคไบโอดีเซล ปัจจัยที่มีผลต่อความพึงพอใจของผู้บริโภคต่อส่วนประสมทางการตลาดด้านช่องทางการจัดจำหน่าย คือ ระดับความสำคัญของปัจจัยด้านช่องทางการจัดจำหน่าย และด้านการส่งเสริมการตลาด และปัจจัยที่มีผลต่อความพึงพอใจของผู้บริโภคต่อส่วนประสมทางการตลาดด้านการส่งเสริมการตลาดคือ ระดับความสำคัญของปัจจัยด้านราคา ด้านการส่งเสริมการตลาดและค่าใช้จ่ายในการบริโภคไบโอดีเซล

คำสำคัญ: ความพึงพอใจของผู้บริโภค ส่วนประสมทางการตลาด ไบโอดีเซล ภาคใต้ของประเทศไทย

INTRODUCTION

Energy has played an important role in economic development of most countries in the world as shown by an evidently high and positive correlation between energy consumption and living standards. At present, most of the world's primary commercial energy supply is derived from natural and exhaustible petroleum resources. Worldwide petroleum consumption has been increasing continuously at the rate of 6-7 percent per year (Schumacher, 1999). The world petroleum reserves are being depleted at an alarming rate and it is

predicted that the length of their supply is not exceeding 40-50 years (Miyamoto, 1997; Schumacher, 1999; Crabbe *et al.*, 2001; Dewulf and Langenhove, 2006).

Additionally, emission from engine combustion is a major cause of atmospheric pollution. The accumulation of carbon dioxide and other greenhouse gases in the atmosphere has resulted in climate changes which have negative consequences on human livelihoods, the global climate and the environment at large.

Concerns over energy security, climate changes and rising oil prices are driving forces to encourage the use of alternative fuel such as biodiesel. The demand for biodiesel has increased continuously in recent years because it is renewable, cheaper and more environmentally friendly. It has been proven that biodiesel can reduce overall carbon dioxide emissions by 78 percent when compared with the petroleum-based diesel. Moreover, its properties are similar in terms of engine performance to the petroleum-based diesel fuel. Also, its additional advantages include greater lubricity, biodegradability, superior combustion efficiency and low toxicity (Ramadhas *et al.*, 2005a; 2005b; Van Gerpen, 2005; Holser and O'Kuru, 2006).

Many companies spend millions of baht trying to assess consumers' satisfaction with their products and services. Similarly, the oil sector also spends million of baht trying to develop products and market tools that elicit satisfaction in the consumers (Farris *et al.*, 2000 cited in Oparah and Kikanme, 2006). Thus, alongside with its science and technology research, biodiesel requires equally continuous research and development to evaluate consumers' satisfaction that may lead to maximum consumer loyalty and word-of-mouth communication.

It is important to study and analyze consumers' satisfaction on biodiesel, especially in southern Thailand where oil palm is cultivated. Assessing satisfaction can help producers improve their products. Moreover, the ability of assessing feedbacks from the consumers can be an important source of information

to enhance competitive advantages. Thus, the outcomes of this research can be utilized by these biodiesel producers to improve their marketing plans and strategies, and develop more suitable biodiesel products to satisfy their consumers and also to maintain environmental integrity and to complement energy security of Thailand.

Objective of the study

This study aims at understanding consumers' satisfaction on marketing mix of biodiesel in major oil palm cultivation provinces of Songkhla, Krabi, and Trang. The specific objectives are;

(1) to analyze consumers' socioeconomic characteristics and their satisfaction on marketing mix of biodiesel, and

(2) to determine factors affecting consumers' satisfaction on marketing mix of biodiesel.

LITERATURE REVIEW

What is satisfaction?

Consumers usually face a broad array of products and services that might satisfy a given need. They make choices based on their perceptions of the satisfaction that various products and services deliver. Satisfaction has been used as an assessment tool for evaluation of goods and services. A review of the existing literature indicates a wide variance in the definition of satisfaction.

Mick and Fournier (1998), Zeithaml and Bitner (2003), and Kotler and Keller (2006) defined satisfaction as being "a judgment that the product itself, provides a pleasurable level of consumer feeling or consumption related fulfillment resulting from comparing the product's perceived performance or outcome in relation to consumer's expectations". If the performance falls short of expectations, the consumer is dissatisfied. If the performance matches the expectations, the consumer is satisfied. If the performance exceeds expectations, the consumer is highly satisfied or delighted. Satisfaction or dissatisfaction with a previous purchase is key

influence on future buying behavior because it might affect expectations for the next purchase.

However, all the definitions share some common elements and when examined as a whole, three general components can be identified: (1) consumer satisfaction is an emotional or cognitive response; (2) the response pertains to a particular focus such as expectations, product, and consumption experience; and (3) the response occurs at a particular time (after consumption, after choice, based on consumption experience, etc.) (Giese and Cote, 2000 cited by Oparah and Kikanme, 2006).

Undoubtedly, satisfaction has been playing an important role in planning marketable products for a long time. Consumer satisfaction is significant for successful marketing because it is one important indicator of product quality. Besides, it influences the choice of the consumption of its product and decision to return and buy them again with no need of extra marketing expenditure. In addition, it leads to a positive word recommendation of the product to friends and relatives, which in turn brings in new consumers (Swarbrooke and Horner, 1999). In addition, they are main indicators of loyalty. Hallowell (1996) has found that customers' satisfaction can be linked to profitability and customer loyalty. Reynold and Beatty (1999) have found that customers' perception of benefits positively affects satisfaction with the salesperson and that customers' satisfaction can predict a good purchase behaviors in the future.

Evaluating satisfaction in terms of an experience is a post-consumption process. There are two different approaches to measuring satisfaction. The first approach is to measure the overall satisfaction with product. The second approach is to measure satisfaction with various dimensions contributing to an overall satisfaction. This requires the identification of individual dimensions of satisfaction (Maddox, 1985). Since biodiesel is a combination of many interconnected components, the measurement of satisfaction within biodiesel requires the identification of its marketing mix components and each component can be analyzed by

measuring the degree of satisfaction.

What is marketing mix?

Marketing mix is one of the major concepts in modern marketing that influences consumer motives. They are often designed to influence consumer decision-making and lead to profitable exchanges. Each element of the marketing mix can affect consumers in many ways (Peter and Donnelly, 2007 cited in Munusamy and Hoo, 2008). Kotler and Armstrong (2004) gave the meaning of marketing mix as the set of controllable, tactical marketing tools that the firm blends to produce the response it wants in the target market. The marketing mix consists of everything the firm can do to influence the demand for its product. The many possibilities can be collected into four groups of variables known as the "4Ps" as; (1) product means the goods and services combination the company offers to the target market, (2) price is the amount of money consumers have to pay to obtain the product, (3) place includes company activities that make the product available to target consumers, and (4) promotion means activities that communicate the merits of the product and persuade target consumers to buy it.

An effective marketing program blends all of the marketing mix elements into a coordinated program designed to achieve the company's marketing objectives by delivering value to consumers. The marketing mix constitutes the company's tactical tool kit for establishing strong positioning in target markets.

METHODOLOGY

The research methodology used in the present study is described in the following details.

Population and sample

The target population for this study were biodiesel consumers in Songkhla, Krabi, and Trang provinces. The actual total sample size of the study was estimated using Cochran (1977) formula and

reserving sample errors of 5 %. Therefore the required total sample size was 303 biodiesel consumers who were divided into 3 groups selected by quota sampling with equal sample size consisting of 101 observations in each of the 3 provinces.

Study design

The study design was a cross-sectional survey. The data were obtained from structured questionnaires. The questionnaires were pretested using Cronbach's Alpha which was 0.87 indicating an acceptable reliability (Nunnally, 1978). Pizam *et al.* (1978) mentioned that satisfaction should be measured on a Likert interval scale. A five-point scale is used as an expression of the consumers' satisfaction level on biodiesel marketing mix, namely, 4.21-5.00, 3.41-4.20, 2.61-3.40, 1.81-2.60, and 1.00-1.80 representing the most, high, moderate, less, and the least satisfaction levels, respectively. Structured questionnaires were used to collect socio-economic data of the sampled consumers and their satisfaction on biodiesel marketing mix. The survey was conducted from February to July 2009. The data were analyzed using statistical and econometric tools as follows:

(1) Frequency, percentage, mean, and standard deviation to describe socio-economic characteristics of the sampled consumers, and their satisfaction level.

(2) Seemingly unrelated regression (SUR) system of equations to determine factors affecting consumers' satisfaction on biodiesel marketing mix. The contemporaneous correlation was tested for independence of disturbances. The linear functional form proved to be the best fit of the data.

Model 1

$$DD = a_1 + a_2PD + a_3PR + a_4PL + a_5PM + a_6EXP + U_1;$$

Model 2

$$DR = b_1 + b_2PD + b_3PR + b_4PL + b_5PM + b_6EXP + U_2;$$

Model 3

$$DL = c_1 + c_2PD + c_3PR + c_4PL + c_5PM +$$

$c_6 \text{EXP} + U_3;$

Model 4

$DM = d_1 + d_2 \text{PD} + d_3 \text{PR} + d_4 \text{PL} + d_5 \text{PM}$
 $+ d_6 \text{EXP} + U_4;$

When DD is consumers' satisfaction level on biodiesel product, assigned 5 is the most and 1 is the least,

DR is consumers' satisfaction level on biodiesel price, assigned 5 is the most and 1 is the least,

DL is consumers' satisfaction level on place of biodiesel, assigned 5 is the most and 1 is the least,

DM is consumers' satisfaction level on biodiesel promotion, assigned 5 is the most and 1 is the least,

PD is biodiesel product characteristics significance, assigned 5 is the most and 1 is the least,

PR is biodiesel price significance, assigned 5 is the most and 1 is the least,

PL is place of biodiesel significance, assigned 5 is the most and 1 is the least,

PM is biodiesel promotion significance, assigned 5 is the most and 1 is the least, and

EXP is consumers' expenditure on biodiesel (baht per month).

RESULTS AND DISCUSSION

Socio-economic characteristics of the surveyed biodiesel consumers

Biodiesel consumers in this sample were mainly male (61.39 %). A large number of the biodiesel consumers were in the working age between 28-37 years (40.27 %) with an average age of 35 years. About 39 percent were undergraduated whereas more than 61 percent were graduated. Main occupation was company's employee (26.40 %). In terms of their income, the biodiesel consumers earned an average income of 24,848 baht per month.

Consumers' satisfaction on marketing mix of biodiesel

As shown in Table 1, consumers were highly satisfied with product characteristics consisting of four aspects. The highest to lowest levels of satisfaction were pollution reduction, energy saving, acceptable overall quality and enhancement of engine power. Similarly, the consumers were highly satisfied with reasonable retail prices of biodiesel.

The consumers were moderately satisfied with place of products consisting of five aspects. The highest to lowest levels of satisfaction were speed of refueling at service stations, cleanliness of service stations, closeness of service stations, number of service stations, and service station covering areas. Similarly, they were moderately satisfied with product promotion aspects. The highest to lowest levels of satisfaction were attractive advertisement through media, provision of knowledge to consumers through media, promotion strategy, customer services by station staff, after sale services, and recommendation by salespersons.

Among these satisfaction level on marketing mix, biodiesel product characteristics received the highest rating average, followed by product price, place of product, and product promotion. These results were consistent with the study of Preyaphankasam (2007) about consumers' behavior and attitude toward biodiesel in Bangkok metropolitan area. It was found that the consumers' attitude toward overall biodiesel product was at 3.66 out of 5 level, consumers' attitude toward overall biodiesel product reliability aspect was at an average of 4.18, and biodiesel product loyalty was at an average of 3.72.

Factors affecting biodiesel consumers' satisfaction on marketing mix

The results of seemingly unrelated regression analysis are shown in Table 2 and can be discussed as follows:

Model 1 indicated that statistically significant variables determining the consumers' satisfaction on product characteristics were product, price and place significances, and consumers' expenditure on biodiesel. The regression model with these explanatory variables

Table 1 Consumers' satisfaction level on marketing mix of biodiesel

Aspects of marketing mix	Mean	Standard Deviation	Level of satisfaction
Product Characteristics			
- Pollution reduction	3.77	0.78	High
- Energy saving	3.76	0.80	High
- Overall quality of biodiesel	3.57	0.81	High
- Enhancement of engine power	3.51	0.86	High
Average satisfaction of product characteristics	3.65	0.67	High
Price			
- Reasonable retail prices	3.59	0.85	High
Average satisfaction of price characteristic	3.59	0.85	High
Place of Product			
- Speed of refueling at service stations	3.37	0.79	Moderate
- Cleanliness of service stations	3.22	0.84	Moderate
- Closeness of service station	3.16	0.91	Moderate
- Number of service stations	3.14	0.93	Moderate
- Service station covering areas	3.11	0.91	Moderate
Average satisfaction of place of product	3.20	0.73	Moderate
Product Promotion			
- Attractive advertisement through media	3.19	0.90	Moderate
- Provision of knowledge to consumers through media	3.18	0.92	Moderate
- Promotion strategy	3.03	0.88	Moderate
- Customer services by station staffs	3.00	0.94	Moderate
- After services	2.93	1.01	Moderate
- Recommendation by salespersons	2.88	0.99	Moderate
Average satisfaction of product promotion	3.03	0.78	Moderate

Table 2 Seemingly unrelated regression analysis results of consumer's satisfaction on marketing of biodiesel

Variable	Model 1	Model 2	Model 3	Model 4
C	0.81**(0.17)	1.04**(0.25)	0.82**(0.20)	0.29**(0.17)
PD	0.27**(0.06)	-0.08 (0.09)	0.07 (0.07)	0.04 (0.08)
PR	0.32**(0.05)	0.60**(0.08)	-0.01 (0.06)	-0.17**(0.07)
PL	0.12* (0.05)	0.21**(0.08)	0.41**(0.06)	0.08 (0.07)
PM	0.09 (0.05)	-0.02 (0.07)	0.25**(0.05)	0.63**(0.07)
EXP	-1.37E-06*(5.90E-07)	-2.41E-06**(8.77E-07)	3.65E-07(6.85E-07)	-2.84E-06**(7.61E-07)
R²	0.50	0.31	0.43	0.39
Adj R²	0.49	0.30	0.42	0.38
D-W Statistic	2.13	1.92	1.80	1.82
S.E. of Regression	0.48	0.71	0.55	0.62

Note: ¹ ** p<.01 * p<.05

² Numbers in parentheses are standard errors

could explain correctly 50 percent of the variation in consumers' satisfaction on product characteristics.

The product, price and place significances were positively related to consumers' satisfaction on product. The findings implied that product significance increased by one score, consumers' satisfaction level on product characteristics tended to increase by 0.27 scores, keeping other variables constant. Price significance increased by one score, consumers' satisfaction level on product characteristics tended to increase by 0.32 scores, keeping other variables constant. Place significance increased by one score, consumers' satisfaction level on product characteristics tended to increase by 0.12 scores, keeping other variables constant. On the other hand, consumers' expenditure on biodiesel was negatively related to consumers' satisfaction on product. This finding implied that consumers' expenditure on biodiesel increased by one baht per month, consumers' satisfaction level on product characteristics tended to decrease by 0.000014 scores, keeping other variables constant.

Model 2 indicated that statistically significant variables determining the consumers' satisfaction on product price were price and place significances, besides consumers' expenditure on biodiesel. The regression model with these explanatory variables could explain correctly 32 percent of the variation in consumers' satisfaction on product price.

The price and place significances were positively related to consumers' satisfaction on product price. This finding implied that price significance increased by one score, consumers' satisfaction level on product price tended to increase by 0.60 scores, holding other variables constant. Place significance increased by one score, consumers' satisfaction level on product price tended to increase by 0.21 scores, holding other variables constant. On the other hand, consumers' expenditure on biodiesel was negatively related to consumers' satisfaction on product price. This finding implied that consumers' expenditure on biodiesel increased by one baht per month, consumers' satisfaction level on product

price tended to decrease by 0.000024 scores, holding other variables constant.

Model 3 indicated that statistically significant variables determining the consumers' satisfaction on place of product were place and promotion significances. The regression model with these explanatory variables could explain correctly 43 percent of the variation in consumers' satisfaction on place of product.

The place and promotion significances were positively related to consumers' satisfaction on place of product. This finding implied that place significance increased by one score, consumers' satisfaction level on place of product tended to increase by 0.41 scores, keeping other variables constant. Promotion significance increased by one score, consumers' satisfaction level on place of product tended to increase by 0.25 scores, keeping other variables constant.

Model 4 indicated that statistically significant variables determining the consumers' satisfaction on product promotion were price and promotion significances, besides consumers' expenditure on biodiesel. The regression model with these explanatory variables could explain correctly 39 percent of the variation in consumers' satisfaction on product promotion.

The promotion significance was positively related to consumers' satisfaction on product promotion. This finding implied that promotion significance increased by one score, consumers' satisfaction level on product promotion tended to increase by 0.63 scores, holding other variables constant. On the other hand, price significance and consumers' expenditure on biodiesel were negatively related to consumers' satisfaction on product promotion. This finding implied that price significance increased by one score, consumers' satisfaction level on product promotion tended to decrease by 0.17 scores, holding other variables constant. Consumers' expenditure on biodiesel increased by one baht per month, consumers' satisfaction level on product promotion tended to decrease by 0.000028 scores,

holding other variables constant.

The results obviously indicated that price significance was positively related to consumers' satisfaction on product and product price. Consumers were highly satisfied with the consumption of biodiesel as a promising alternative energy sources and a substitute for conventional diesel oil. Its price was reasonable, and cheaper than diesel oil which saved their monthly expenditures. Moreover, its unique physical properties as an environmentally friendly product, energy saving, and clean combustion interested the consumers. These results were consistent with the study of Preyaphankasam (2007) who found that most consumers refueled biodiesel because it was cheaper than diesel oil, energy saving, problem-free with the engine, and cost saving. Similarly, The study of Chairuangwit (2009) found that price affected consumers' decision-making on their consumption of biodiesel. However, price significance was negatively related to consumers' satisfaction on product promotion due to the difference between biodiesel and diesel oil prices was less. Furthermore, place significance was positively related to consumers' satisfaction on product, product price, and place of product due to biodiesel was only available in some service stations. The studies of Limpawiphakorn (2007 cited in Suriyanontarin, 2007), Pandaeng (2008) and Chairuangwit (2009) found that product place most affected consumers' decision-making on their consumption of biodiesel. Thus, product characteristics, price competitiveness, place of the product, and product promotion of biodiesel were key determinants of its satisfactory consumption.

CONCLUSIONS AND RECOMMENDATION

Conclusions

Biodiesel is renewable energy and can help to improve future energy security and economic development of Thailand. Therefore, the government has heavily advertised and promoted biodiesel use as

an alternative fuel for vehicles. The highest of consumers' satisfaction on marketing mix of biodiesel was its product characteristics, followed by product price, place, and promotion. The statistically significant variables determining; 1) consumers' satisfaction on the biodiesel product were their assigned importance to biodiesel product availability, their price and places of sale, and consumers' expenditure on biodiesel; 2) consumers' satisfaction on biodiesel price were their assigned importance to prices and places of sale, and consumers' expenditure on biodiesel; 3) consumers' satisfaction on biodiesel place were their assigned importance to places of sale and product promotion; and 4) consumers' satisfaction on biodiesel promotion were their assigned importance to prices and product promotion, and consumers' expenditure.

Recommendation

The results of the study led to some important recommendations that biodiesel entrepreneurs and relevant government agencies should focus on developing marketing mix strategies to provide consumers with more satisfaction. Some of the recommendations are;

(1) Product strategy. The biodiesel product should be developed to have more diverse types. Research and development of the product characteristics should be encouraged.

(2) Price strategy. The prices should be visibly displayed especially the difference between biodiesel and diesel oil prices.

(3) Place strategy. Number of service stations should be increased to cover more and many areas.

(4) Promotion strategy. Campaigns and attractively advertisement through appropriate channels should be promoted to provide useful knowledge and clear information about biodiesel regarding pollution, engine performance. Moreover, provision of training courses for biodiesel station employees to enhance knowledge of consumers, and arrangement of promotion activities in various forms.

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