



Effects of Marketing Mix Factors on Customer's Decision to Purchase Community-Made Fermented Soil: A Survey in the Eastern Peri-Urban Area of Bangkok, Thailand

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ABSTRACT

This study investigates the marketing mix factors affecting customers' decision to purchase community-made fermented soil (CMFS). Data were collected in the eastern peri-urban area of Bangkok, Thailand, using survey questionnaires. A total of 202 customer respondents were chosen through purposive sampling. Two sampled groups of customers were identified, the first group (n = 53) includes customers who already purchased and used CMFS, while the second group (n = 149) includes those who intend to use CMFS in the future. The data were analyzed using descriptive statistics, and a binary logistic regression was employed to investigate the marketing mix factors affecting customers' purchasing decisions. Customers who already purchased and used CMFS, the price factor was the most important among the marketing mix elements. While customers with future intentions to purchase CMFS, market promotion factors were the most important. The binary logistics regression results revealed that adequate nutrients for plant growth and the sales location increase the odds for customers to purchase community-made fermented soil. Moreover, a higher probability of purchase intention was observed among consumers with higher perceived health and environmental concerns. This implies the viability of CMFS as an alternative to chemical fertilizer and a viable additional income for farmers.

1. INTRODUCTION

Due to the expansion of urban areas, land use has shifted from agricultural use to commercial use. As a result, the agricultural lands around urban areas, especially developing countries' capital cities, have been greatly reduced [1]. Similarly, Thailand's agricultural areas like the eastern peri-urban area in Bangkok, have been affected by the continuous expansion of urban areas. Although ministerial regulations are being enforced following the Bangkok Comprehensive Plan, the agricultural lands in peri-urban areas have still recorded a significant decline [2]. Meanwhile, urbanization has generated a range of intermediation activities with the rural community, promoting the diversification of income sources in rural areas and job creation in cities [3]. As a driving force behind peri-urban development, community agricultural products have been developed to maintain agricultural occupations and generate additional income for community members.

Consequently, farmers in the Nong Chok district, a community in the eastern peri-urban area of Bangkok, organized a group of farmers to produce agricultural

products as part of their livelihood program. Fermented soil was the chosen main agricultural product of the community. The livelihood program was initiated based on the crop production constraints experienced by farmers, such as declining soil health and quality. Healthy soils are the basis for healthy food production [4], and soil pollution has greatly affected the food safety of some agricultural commodities [5]. For instance, Opitz et al. [6] observed that peri-urban agricultural practices mainly used local soil and applied management practices that are site-specific soil conditions. While Singh and Kumar [7] mentioned that vegetables grown in peri-urban lands are likely to be contaminated with heavy metals and are unsafe for consumption. However, several studies argued that soil heavy metals are also important assimilates that are most beneficial for vegetable crops, whose plant roots absorb pollutants and transport them to seeds [8], [9]. Hence, growing agricultural products in peri-urban areas require good soil quality conditions.

According to Dotaniya et al. [10], soil quality is a crucial factor in crop growth and determining the availability of plant nutrients. One of the ways to improve soil quality involves using manure-based fertilization [11].

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Realizing the importance of soil quality in crop production, during the third quarter of 2009, the Nong Chok community initiated a community-made fermented soil (CMFS) to provide healthy soil for crop production, particularly in peri-urban areas. The CMFS was produced based on the knowledge accumulated from various trainings conducted by experts and the tacit knowledge of community members who initially applied the CMFS fertilizer. The product contains mixed fermentation of different types of organic matter, with the nutrients required by soil to support plant growth and enhance crop yield. At present, the CMFS was able to generate average monthly sales of 3,000 Thai baht (THB), serving as additional income for community members and projected to increase in the succeeding years of operation.

Considering the supply capacity of CMFS, a study by Suwanmaneepong et al. [12] found that production is labor-intensive (requiring 3 to 4 community members) to procure raw materials, the inadequacy of funds, and ineffective marketing strategies. Addressing marketing limitations is one of the critical factors for the success of small-scale businesses [13], [14]. Therefore, marketing is considered one of the essential business components for formulating product planning and strategies in business operations. Moreover, marketing mix factors could influence the purchasing decisions of customers [15]. Therefore, these factors are considered marketing tools used by an organization to achieve its target marketing objectives [16]. Thus, analyzing the marketing mix can be a major determinant of success and differential advantage in any marketing environment [17], and it can be applied to community businesses for successful operations [18]. However, the traditional marketing mix concept lacks customer orientation [19], [20]; thus, this research emphasizes customer interactivity.

As mentioned above, the factors influencing customers' buying decisions constitute crucial information for a community to develop agricultural products and meet market demand. The purchasing decision of customers is a step-in process for identifying what buyers prefer in choosing a product [21] and can be considered an important measure of success in marketing and business processes [22]. Based on this premise, this study aims to investigate the factors affecting customers' decisions to purchase CMFS. The study used the case of the farming community in the Nong Chok district situated in the peri-urban area in Bangkok, which produces fermented soil (i.e., CMFS). The study results can be used to develop and improve the community's agricultural products to meet customer needs and formulate effective marketing strategies. In addition, relevant agencies (e.g., private, government, and non-government organizations) can utilize the study results to draft guidelines for future training programs that aim to enhance the community's agricultural production and marketing strategies.

2. MATERIALS AND METHODS

2.1. Study area

The Nong Chok district, situated in a peri-urban area in the eastern part of Bangkok, Thailand, has the largest agricultural land area in the province. The agricultural land area is estimated to be 75,527 rai (12,084 ha), accounting for 41.89% of the total agricultural area of the province [2]. However, urbanization decreases the coverage of agricultural land and threatens those who rely on agriculture as a source of livelihood. In response, CMFS production was developed to provide an additional and alternative source of income for the Nong Chok farming community.

CMFS is a formulation of organic matter: animal manure, rice bran, banana microbes, rain tree leaf, coconut flakes, and soil. Fermentation of this organic matter can be done overnight. Figure 1 shows the CMFS production process. Commercializing the CMFS requires a large production scale while still in its early stages of product development and marketing the target market involved mainly nearby farms. Future plans of the community include expanding the market coverage of CMFS promotion, and the results of the current study aim to provide insights on the needed product features to prioritize improving the product's marketability. Also, the program is expected to benefit other stakeholders in the supply chain, especially suppliers of farm inputs.



Fig. 1. The production process of community-made fermented soil of the Nong Chok community.

2.2. Population and sample size

The respondents of the study were divided into two groups. The first group included a total number of 53 customers who had already purchased and used CMFS. The second group included customers with future intentions to purchase and use CMFS. The population size for the second group was uncertain; hence, consultation among community group members was performed to identify the target respondents. Purposive sampling was employed to select eligible customers to participate in using CMFS. A total of 202 completed questionnaires were completed from the first (53) and second (149) groups of customers.

2.3. Research instrument

A survey questionnaire was used as the main instrument for data collection. The questionnaire has two sets, each of which contains two parts as follows:

Part 1: Demographic characteristics such as gender, age, marital status, education, occupation, and monthly income.

Part 2: Customer perception based on an importance rating of the marketing mix factors in purchasing CMFS.

The marketing mix is a set of marketing tools companies or organizations use to achieve their marketing objectives [23] and to produce the response that companies want from their various target markets [24]. It consists of the 4Ps of marketing mix: product, price, place, and promotion [25]. The 4Ps of marketing are defined as follows:

A product is anything that attracts attention, acquisition, use, or consumption that might satisfy a want or need [26]. The price is the amount customers spend to obtain the benefits of owning or using a product or service [25]. The marketing mix involves all company activities that make the product available to the targeted customer [27]. Finally, promotion includes all the activities marketers undertake to inform customers about their products and encourage potential customers to buy them [28]. The four primary promotional mix tools are advertising, personal selling, sales promotion, and public relations [29].

Using a five-point Likert scale (e.g., 1= not important to 5= very important) [30], the respondents were asked to rate their level of agreement with statements concerning the importance of each marketing mix factor for purchasing CMFS. Descriptive statistics were employed to describe the customers' demographic characteristics and perceptions based on an importance rating of the marketing mix factors in purchasing CMFS. The binary logistic regression was employed to determine the influence of the marketing mix variables on customers' decision to purchase CMFS. Logistic regression is an appropriate analysis technique for modelling discrimination problems in the marketing context. Logistic regression is used when the dependent variable is categorical and typically refers to the two categories [31]. The dependent variable was analyzed concerning the 22 independent variables, as presented in Table 1. The dependent variable was the purchasing decision of customers on CMFS, which was equal to 1 if used CMFS, and 0 if CMFS was not used.

3. RESULTS AND DISCUSSION

3.1. Sociodemographic and farming characteristics

In group 1, customers who currently use CMFS are middle-aged, ranging from 41 to 50 years old, and were predominantly female (52.83%). The majority of the

respondents were married (79.25%), the highest educational attainment was a bachelor's degree (33.9%), and the majority worked in government offices or state enterprises. The median monthly income was 18,300 THB for this group. Vegetable growers in the sampled group grew vegetables for household consumption (75.5%).

Table 1. Marketing mix factors for the community-made fermented soil of the study

Factors	Name
<i>Product</i>	
X ₁	Adequate nutrients for plant growth
X ₂	The amount of soil packed (5 kg per bag)
X ₃	Helping plants grow well
X ₄	Suitable packaging size and ease of use
X ₅	Beautiful packaging
X ₆	Showing a soil quality certification seal
X ₇	Showing a label that indicates the raw material components
<i>Price</i>	
X ₈	Clearly showing a price tag
X ₉	A suitable price for the quality of soil
X ₁₀	A suitable price for the amount of soil packed
X ₁₁	Showing a price comparison with other soil brands
<i>Place</i>	
X ₁₂	Being located in a noticeable place
X ₁₃	Striking and attractive product placement indicates that the product is worth buying
X ₁₄	In placing the products in a shop, a position that is appropriate and convenient for purchase and transportation
X ₁₅	Having a convenient communication channel for ordering
X ₁₆	Having a distinct sign indicating a sales location
X ₁₇	Having various channels/sales locations that make the product easy to buy
<i>Promotion</i>	
X ₁₈	Giving an additional product when buying larger quantities each time
X ₁₉	Having clear suggestions for soil properties
X ₂₀	Delivery service provision in nearby areas
X ₂₁	Special discounts are offered to community members when purchasing
X ₂₂	Demonstrating products that are grown based on using the soil for an evident result

Whereas in group 2, which are customers who intend to use CMFS in the future, most respondents also fall within the middle-age range. In terms of gender, the distribution was fairly equal, with 51% being male, and the majority of them were married (67.11%). Educational attainment was predominantly at the primary level (36.91%), while the main occupation was farming (31.54%), with 32.2% being vegetable growers. The observed median monthly income was 14,450.

3.2. Importance of Marketing mix factors in purchasing CMFS

Table 2 illustrates the details of the marketing mix factors and the mean of the customers’ importance ratings. For the customers in group 1, who have already purchased fermented soil, the results show that the average rating for all factors ranged from 3.49 to 4.47, with the highest average rating being obtained by the ‘helping plants grow well’ (X3) product factor. Notably, fermented soil is a type of fertilizer that supplies essential plant nutrients [34], boosting soil fertility and contributing to improved plant growth [35].

In contrast, the lowest average rating among the factors was recorded by another product factor, ‘beautiful packaging’ (X5), with a mean score of 3.49. As packaging’s main purpose is product identity and protection [36], the packaging is as simple as a durable bag that specifies to customers the nutrient composition of the fertilizer material.

Regarding the potential customers of fermented soil (Group 2), the ratings of the marketing factors ranged from 3.78 to 4.56. As shown in Table 2, the ‘adequate nutrients for plant growth’ (X1) and ‘helping plants grow well’ (X3) product factors were rated as very important, with these two factors obtaining the highest mean score. Notably, fertility can be improved by supplementing fermented soil [37]. In addition, healthy plant root development is stimulated, as the organic matter in this soil nourishes microorganisms. This keeps the soil balanced and healthy and makes plants more productive [33].

Meanwhile, beautiful packaging (X5) was rated the lowest, obtaining a mean score of 3.78. Although the packaging is an essential aspect of product development, its practicality, in this case, is lower than that of the other factors. Notably, fermented soils are packaged in durable bags where information about their raw materials and nutrient components is specified [38]. This suggests that improving the marketing mix would necessitate prioritizing other factors, such as product and promotion, which are more important.

3.4. Influence of the marketing mix factors on consumers’ decision to purchase CMFS

A binary logistic regression was employed to investigate the influence of the marketing mix factors on customers’

decision to purchase fermented soil. The chi-square value, an overall measure of model fit, is significant at $p < 0.05$. Larger values of the Cox & Snell and Nagelkerke pseudo-R-squared indicate a better model fit, where the latter corrects the former to have a maximum value of 1 [39-41]. Approximately 73% of all cases in the data were correctly classified based on the logistic regression model.

Table 2. Importance rating of the marketing mix factors in customer groups’ decision to purchase CMFSS

Factor	Group 1			Group 2		
	\bar{x}	S.D.	Rate	\bar{x}	S.D.	Rate
<i>Product</i>	4.07	0.48	I	4.28	0.59	I
X ₁	4.32	0.64	I	4.56	0.64	VI
X ₂	3.96	0.80	I	4.13	0.87	I
X ₃	4.47	0.57	I	4.56	0.64	VI
X ₄	4.08	0.78	I	4.36	0.75	I
X ₅	3.49	0.57	I	3.78	0.95	I
X ₆	4.02	0.77	I	4.26	0.86	I
X ₇	4.13	0.76	I	4.34	0.81	I
<i>Price</i>	4.22	0.68	I	4.30	0.71	I
X ₈	4.11	0.80	I	4.10	0.95	I
X ₉	4.34	0.78	I	4.48	0.73	I
X ₁₀	4.26	0.76	I	4.45	0.78	I
X ₁₁	4.15	0.79	I	4.17	0.87	I
<i>Place</i>	4.01	0.64	I	4.22	0.65	I
X ₁₂	4.11	0.72	I	4.34	0.74	I
X ₁₃	3.98	0.69	I	4.20	0.76	I
X ₁₄	4.02	0.97	I	4.26	0.77	I
X ₁₅	4.00	0.76	I	4.11	0.83	I
X ₁₆	4.21	0.81	I	4.29	0.76	I
X ₁₇	3.75	0.93	I	4.13	0.79	I
<i>Promotion</i>	4.12	0.77	I	4.32	0.73	I
X ₁₈	4.06	0.90	I	4.36	0.89	I
X ₁₉	4.25	0.85	I	4.34	0.81	I
X ₂₀	4.06	0.94	I	4.24	0.91	I
X ₂₁	4.13	0.87	I	4.44	0.84	I
X ₂₂	4.13	0.92	I	4.21	0.92	I

Note: I = important and VI = very important

Table 3. Results of the analysis of the factors affecting

customers' decision to purchase CMFS

Factors	B	S.E.	Wald	Sig.	Exp(B)
<i>Product</i>					
X ₁	-1.170	0.530	4.880	0.027	0.310
X ₂	0.003	0.299	0.000	0.991	1.003
X ₃	0.947	0.528	3.214	0.073	2.578
X ₄	-0.217	0.344	0.399	0.527	0.805
X ₅	-0.377	0.288	1.712	0.191	0.686
X ₆	-0.330	0.336	0.964	0.326	0.719
X ₇	-0.336	0.399	0.707	0.400	0.715
<i>Price</i>					
X ₈	0.603	0.350	2.972	0.085	1.827
X ₉	-0.090	0.532	0.028	0.866	0.914
X ₁₀	-0.416	0.484	0.741	0.389	0.660
X ₁₁	0.562	0.382	2.168	0.141	1.755
<i>Place</i>					
X ₁₂	0.108	0.434	0.061	0.805	1.114
X ₁₃	-0.216	0.426	0.257	0.612	0.805
X ₁₄	0.037	0.356	0.011	0.917	1.038
X ₁₅	0.371	0.383	0.939	0.333	1.450
X ₁₆	0.373	0.420	0.789	0.374	1.452
X ₁₇	-0.830	0.333	6.218	0.013	0.436
<i>Promotion</i>					
X ₁₈	-0.190	0.324	0.344	0.557	0.827
X ₁₉	0.516	0.404	1.634	0.201	1.676
X ₂₀	-0.118	0.349	0.115	0.735	0.889
X ₂₁	-0.269	0.404	0.441	0.506	0.764
X ₂₂	0.235	0.301	0.610	0.435	1.265
X ₁₈	-0.190	0.324	0.344	0.557	0.827
Constant	2.034	1.430	2.022	0.155	7.641
Sample			202		
-2Log-Likelihood			199.281		
Cox & Snell R Square			0.152		
Nagelkerke R Square			0.122		
Chi-square			33.232*		
Percentage Correct			73.8		
<i>Note: Level of significance at 0.05</i>					

Customers' decision to purchase community-made fermented soil was measured based on the 4Ps marketing variables: the product, price, place, and promotion factors. As shown in Table 3, the presence of adequate nutrients for

plant growth is significant among the seven attributes under the product variable. Despite adequate nutrients for plant growth (X1), the odds of customers buying commercial fermented soil are 0.31 times those of buying the available community-made fermented soil. However, by increasing the number of sales locations (X17), the odds of customers buying commercial fermented soil are 0.43 times those of buying the community's fermented soil. This implies that increasing the accessibility of the product by an additional number of sales locations contributes to a higher probability of purchasing CMFS. Moreover, these results can be attributed to introducing new products in a market where similar products are already recognized, rendering market entry complex and competitive. Therefore, increasing the demand for these agricultural products requires more support to have a comparative advantage over competing products. Some variables in the model are not statistically significant; contextually, the results still give valuable insights for informed decision-making. For example, a price tag, a market outlet in the most noticeable area, and convenient communication channels increase the demand for community-made fermented soil. Developing these attributes can support product development for improved product marketability.

4. CONCLUSIONS

This research provided insights into customers' perceptions of the importance of marketing mix factors in purchasing community-made soil fertilizer and how these factors influence customers' purchasing decisions. The survey was conducted in the eastern peri-urban area of Bangkok, near the community production point. This research investigated the marketing mix factors affecting the purchasing decision of two groups of customers: the first group consisted of 53 customers who currently use fermented soil. In contrast, the second group was composed of 149 prospective customers who intend to use fermented soil in the future. Overall, the results revealed that the price was the most important factor for customers who currently use CMFS, with an average rating of 4.22. At the same time, marketing promotion was the most important factor for those who intend to use CMFS in the future, with an average rating of 4.32. The binary logistic regression results showed that adequate nutrients for plant growth and sales locations significantly affected customers' decision to purchase CMFS. The odds of customers buying commercial soil fertilizer were 0.31 times those of purchasing community-made soil fertilizer. However, by increasing the number of sale locations, the odds of customers buying commercial soil fertilizer were 0.43 more than those buying community-made soil fertilizer.

Moreover, the results suggested that communities should provide soil nutrients information on packages to inform customers about product features. Furthermore, providing a demonstration plot for soil product usage can

allow customers to notice the crop grown. In addition, developing market outlets can support opportunities for customers to access more products. These factors can be considered information in community agribusiness planning and for product improvement, marketing, and community agricultural products that are efficient in line with customers' requirements. Aside from fulfilling customers' requirements, maintaining customer relationships and building brand loyalty with the CMFS is as essential as acquiring more customers. This research provides helpful information related agencies can use as guidelines in designing marketing training programs for community products consistent with market requirements. Finally, the concepts and results of this research can be applied to develop agricultural products for communities in other areas.

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