Preference for Local Inputs through the Lens of Thai Snacks

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ABSTRACT

A movement toward the use of local inputs in the production of processed agricultural products, taking place worldwide during the last few decades, has led to the change in consumption pattern. To provide entrepreneurs with necessary information about how consumers react to this movement, this study aims to analyze factors influencing consumers' preferences for snacks made from local raw materials in Thailand. The questionnaire was constructed to retrieve consumers' personal information, namely socio-economic, opinions, attitudes, and understanding about related issues. The analysis was undertaken using binary model and marginal effects. The estimated results from five models with 19 independent variables show the explanatory power of several variables, for example, education level, age, products' packaging, nutrition, standard, safety, quality, the benefits of local raw materials, and respondents' understanding about food issues. However, the results of the estimation on different generation groups provide varied outcomes.

Keywords: Consumer preferences; snacks; local inputs; generation effect.

1. INTRODUCTION

Consumers' buying decision of processed agricultural products usually depends on a number of factors. Some involve the products' qualities while the others relate to consumers' characteristics. Among these matters, lately, the environmental-friendly characters of the products seem to receive much attention from the public. Such an issue as the over-use of chemical fertilizer and imported raw materials as well as the increase in food mile is seen as environmentally hazardous. Recently, not only, the organic farming is encouraged to replace regular farming, but also the local content produce and product has increasingly been promoted. The use of locally grown produce in the production of processed agricultural goods thus can better climate conditions. It also enhances food quality and making them fresher. Besides, using local inputs in the production can positively affect the agricultural sector in several aspects. For example, the local sourcing of inputs can generate income for farmers, allowing them to enjoy more stable income and higher standards of living. Also, the domestic supply chain can be developed to its full capacity.

Among products' features, where the agricultural produce grown has become an important attribute and consequently determined consumers' behaviors. Products' less travelled character is considered to suggest their good physical and environmentally-friendly qualities which then attract consumers' purchasing interest. Buying products made from local produce indicates not only the pursuit of new food quality trend by consumers but also their support for the good cause of improving farmers' welfare. In addition to those aspects,

international trade also benefits from local produce by saving foreign currency. As using local inputs in the food production involves food quality, environmental protection and international trade position as well as farmers' income generation, the issue of local content has thus increasingly received attention from academic and non-academic communities. To address the question of how to enhance the market opportunity of locally produced products, understanding about consumer's behavior is then undertaken as part of fruitful information to formulate the right strategy.

To contribute on this issue, this paper addresses Thai people' consumption behaviors toward snacks, especially made from fresh cassava. Because cassava is accounted as one of the economically important products in Thailand, unsurprisingly, the country is abundant with a variety of cassava breeding of both industrial use and direct consumption. Thus, snacks, cassava chips, enjoy a high possibility to be commercialized and create further impact on both social and economic dimensions. To address the issue of local content as stated above, chips made from cassava can reasonably be taken as the case study as they can be almost completely substituted for potato chips. However, due to their novelty nature, cassava chips have not widely known among consumers. The factors potentially affecting consumers' buying decisions are not actually aware of, making the marketability of cassava chips is quite difficult. Therefore, the study aims at exploring the determinants of people's consumption of snacks, especially chips, made from local cassava. The study's main hypothesis is that using fresh local cassava as a raw material for the production of chips should encourage Thai consumers to hold the positive opinion about these products then buying more of them.

The paper is organized as follows. The next section respectively presents the related literature and methodology which help shaping research framework. The data description, empirical result, and conclusion and discussion is further illustrated.

2. LITERATURE REVIEW

The significance of using local inputs in the food production has been widely explored and discussed. Consumers' preference for chips with local content can be revealed through the contingent valuation method which is to ask respondents to express their intention to pay premium price for cassava chips. Empirically, the willingness to pay for goods made from local content is widely analyzed. For example, Darby et al. (2006) indicate that products' freshness and home-bias consumption are among the factors stimulating people to buy local products and they generally are happy to spend more for this. It offers a solid groundwork for the potential new demand for locally produced goods. This study also shows that people are ready to spend more on locally processed foods, and the value of this payment varies according to socio-economic characteristics.

Consumers' buying decisions and their willingness to pay for products made in specific areas in the United States have been widely analyzed. For example, Brown (2003) explores individuals' preferences for food with local contents in Southeast Missouri. This analysis reveals that with the belief in the higher quality of local produce, consumers are interested in quality and freshness. People engaged in environmental protection with higher education and income tend to pay more for local products. At the same time, the ones with the farming sector background are likely to agree to pay further for local products. Another work focuses on how the understanding about homegrown products affects consumers' preferences for broccoli farmed in California and two local varieties. This study indicates the significance of information access. Without information, consumers choose the Californian broccoli's look

and flavor over the two local types. Nonetheless, when respondents realize the source of the homegrown types, they value them more. The findings show willingness to pay a premium price for local broccoli (Fan et al., 2019).

　　Jensen et al. (2021) examine the case of processed food products and their findings are consistent. They investigate the determinants of the willingness to pay for hard apple cider processed locally. Several features of this product and their association with buyers' behaviors are explored. It shows that people are keen to pay higher amount for local-made hard apple cider over the current price of the standard products. Some factors, for instance, satisfaction for homegrown products, neighborhood, and shopping areas can influence the value of premium price. In addition, such products' attributes as sweetness and dryness affect people's purchasing intentions. Those works of Brown (2003), Fan et al. (2019), and Jensen et al. (2021) imply individuals' advocacy for foodstuff made from local raw materials as suggested by their preferences and willingness to spend larger amount.

3. METHODOLOGY

This research is the analysis at a micro-level. The individual information is elicited from the questionnaire, which is designed to cover socio-economic characters, attitude, behavior, and knowledge on related issues to the study. The 1,000 surveyed individuals are asked to voluntarily complete all questions. Before surveying, the test of reliability of questions is performed with Cronbach's Alpha coefficients (Jump, 1978). A test of 51 questionnaires implies the high confidence of reliability.

　　To approach the answer to research questions, the Ordinary Least Square (OLS) method is employed to estimate the coefficients of relevant factors which include personal information, viewpoint, consuming pattern, and awareness and understanding. The OLS model is expressed as following equation;

$$LOC_i = a + \sum_{h=1}^{8} b_h \, CHV_{h,i} + \sum_{u=1}^{4} c_u \, UNP_{u,i} + \sum_{s=1}^{9} d_s \, SEC_{s,i} + \varepsilon_i$$

where the LOC_i is the grand mean of individual's preference for local content and the source of raw material in the case of cassava chips. The subscript i denotes the 1,000 surveyed individuals as the sample who live in the five regions of Thailand. CHV, UNP, and SEC respectively contained the group of variables: consumers' behavior in buying snacks, and understanding, Thai national sentiment, and perception and awareness, and socio-economic characteristics. The interested coefficient of 19 relevant variables are small letters of b, c, and d, and a is the constant term. The ε stands for error terms. Data definition and description are provided in detail, as shown in Table 1. It is worth to note that some of questions are self-measurement, such as national sentiment, and related to opinion.

　　Moreover, this study also aims to answer the question: how preference for products made from local content of groups of generation is differently determined. The OLS models as estimated above are employed to approach the answer. The sample group is hence separated into four sub-sample groups based on their age generations. The generations are commonly grouped as generation Z, Y, X and baby boom, whose ages are 18-20, 21-37, 38-53, and 54-72 years old, respectively. The outcome from those estimations could reflect the generation effect as they experience different conditions and situations in both economic and historical contexts. Those differences influence personality features, viewpoints, and thoughts of those people which would show the differences in buying decisions and behaviors.

Table 1 Definition and description of relevant variables influencing the preference for local content and source of raw material produced snacks

Variable	Definition
LOC	This variable is undertaken as the independent variable. It is the mean of four questions related to preference for local content and the source of raw material produced snack of surveyed individuals.
Relevant variables are categorized into three groups regrading buying behavior and decision, understanding, attitude and perception, and personal characteristic	
Consumers' behavior in buying snacks (CHV)	
PRICE	To capture the effect of price on local source produced, two related questions are asked respondents too rate how important price is. This variable is thus the average value of individual' realized scores.
PACK	This variable states how importance of appearance of the packaging to individual' buying decision. It is the average of rating scores of two questions.
TASTE	This variable is the average of rating score from two questions which reveal the preference on importance to taste. It would elicit the explanatory power of taste on buying decision of snack.
BEFT	To elicit how individuals undertake the indirect benefit from locally produced snack in case of cassava chips, four questions are designed based on four micro-macro aspects, including farmer's income, environment, international trade, and academic competency. This variable is the mean scores of opinions about the preference on those four questions.
PROMO	To assess opinion levels on advertisements and media influencing buying decision, respondents are to specify five rating scores of two related questions. Those rating score will be calculated in the average of giving importance to the issues.
NUR	This variable is mean scores of opinions about the significance of nutrition of six related issues which influence on purchasing decisions.
SSQ	It represents mean of six questions that corresponds to the opinion level on snack quality, standard, and safety, for example natural minerals, sugar content and expired date. This variable also reveals health concern which manifests in purchasing decision.
PLOC	This variable indicates how often have individual bought snacks from the grocery store. It is marked as almost always=3, sometimes=2, and never=1. More often buy form the grocery store would show high preference on locally material produce in the case of cassava chips.
Understanding, Thai national sentiment, and perception and awareness (UNP)	
UND	This variable captures the effect of recognition and understanding about local content and source of raw material produced and related this matter that are designed as true-false answer of five questions. Correct answers are given 1 point while wrong answers are marked 0 point. It is hence demonstrated in the percentage.
PECON	The individuals' sentiment on the aspect of economic and social situation of Thailand is average of rating sore of five questions. The higher score indicates the higher sentiment on Thai nation.
PAG	This variable reveals the national pride in the aspect of leading countries in agriculture and processed agriculture. It is the average of rating score of five related questions. The higher score indicates the higher sentiment on Thai nation.
AENVI	Perception and awareness about environment are to capture how individual concerns about environment. This variable is average of rating score of four questions. The higher score implies the higher conscious on environment.
The individual's information: socio-economic characteristics (SEC)	
GFEM	As females generally are more considered on surrounding issues and respond on household matters, they would possibly tend to favor local produced. This variable is thus undertaken into two groups of gender: female=1, others=0.
AGE	It is age of respondents in years which start at 18 years old.
EDU	To reflect how the preference for locally produced chips can be explained by education, this variable is thus marked; a bachelor's degree/vocational diploma and higher=1, others education levels=0.

Variable	Definition
FMEM	The numbers of person live in the same household.
GOV	This represents respondents' occupations which is separated into six groups, namely student, companies' workers, government's officials, business owner, independent workers, and others. This variable is divided into two groups: government officials=1; otherwise=0.
INC	Under the common belief, purchasing power would positively affect individuals' preference of buying. Because the National Economic and Social Development Council (NESDC) reports per capita income in 2022 of Thai people at TH฿ 248,468 pre month. This variable is therefore marked income at TH฿ 20,000 per month or more=1, otherwise is 0.
race	The question of respondents' race is divided into four ethnic groups: Thai-Thai, Thai-Chinese, Thai-Muslim, and others. To assess the impact of ethnicity, the nationality variable is separated into two groups: Thai-Thai=1, others=0.
NE	Sample group covers five regions of Thailand. Because the largest area of cassava cultivation is in northeastern region, individuals who come from northeastern region tend to have high level of preference on cassava snack. The hometown is a dichotomous variable: hometown and still living in Northeastern region=1, others=0.

Note: The questions are designed to let surveyed individuals measure their preference or opinion based on the Likert scale from strongly important = 5 to least important = 1.

4. DATA DESCRIPTION

According to Table 2, personal information of 1,000 surveyed individuals is summarized. Half of them is male and more than 60% have finished or still study for bachelor's degree or vocational diploma. The average age is 38.85 years. Because generation Y and X are the largest group as reported by the demographic structure, about 90% of sample are thus taken from these two generations. The numbers of family member of respondents imply the size of household at mostly medium to large. This could, in turn, suggest the financial difficulty. Moreover, about half of respondents are officials at government-related agencies while around one-third work at private companies or own businesses, and only 30% still study. Respondents' monthly income reveals that half of them earn less than TH฿ 20,000 and the other half is above TH฿ 20,000. Regarding the monthly average income per capita, average income of sample is said to be equally distributed. The majority of surveyed participants self-declare as Thai-Thai. The hometown of most participants is in the Central region, about 26.5%, while only 8.7% are from the capital city of Bangkok and its vicinity.

Table 2 Demographic information and socio-economic characteristics

Characteristics	Number (%)	Characteristics	Number (%)
Gender:		**Family members:**	
Male	532 (53.2)	≤ 4	652 (65.2)
Female	421 (42.1)	5-6	277 (27.7)
Others	47 (4.7)	≥ 7	71 (7.1)
Age: (average = 38.85 years old)		**Average income per month (TH฿):**	
18-20 years old (Generation Z)	23 (2.3)	≤ 20,000	526 (52.6)
21-37 years old (Generation Y)	492 (49.2)	20,001-40,000	361 (36.1)
38-53 years old (Generation X)	407 (40.7)	≥ 40,001	113 (11.3)
54-72 years old (Baby Boomer)	78 (7.8)	**Nationality:**	
Education:		Thai-Thai	876 (87.6)
≤ high school certificate	162 (16.2)	Thai-Chinese	99 (9.9)
Bachelor degree or vocational certificate	698 (69.8)	Thai- Muslim and others	25 (2.5)
≥ master degree	140 (14.0)	**Domicile:**	
Occupation:		North	199 (19.9)

Characteristics	Number (%)	Characteristics	Number (%)
Student	88 (8.8)	Northeast	213 (21.3)
Private company employee	225 (22.5)	Central	265 (26.5)
Civil servants/state enterprises/other government agencies	473 (47.3)	South	236 (23.6)
Business owner	107 (10.7)	Bangkok and Metropolitan	87 (8.7)
Freelance, and others	107 (10.7)	**Total number sample population**	**1,000**

The average of rating score on how surveyed individuals give importance to four issues related to preference for local content and sources of raw material is shown in Table 3. Individuals are asked to show their opinions by rating the score based on the 5-point Likert scale questions which, on the other hands, measure the level of preference for those issues. Overall average score of those four issues is considered as above middle level. Individuals seem to give similar preference among issues. However, individuals averagely reveal the highest preference for labeling stating made from raw materials and produced in Thailand by willing to pay a premium price. The second issue that people give importance is the source of raw materials as input to produce snacks. Both issues also receive higher rating score than the average score. Even though they show slightly different average score, they raise interested evidence about the domestic raw materials. Individuals seem to take note on the source of raw material.

Table 3 Preference on local content and source of raw material

Issues	Mean
Give the importance of product produced using domestic raw materials.	3.549
Consider buying snacks from the source of raw materials	3.643
Consider buying snacks from local/domestic raw materials produced	3.603
Willing to pay more for label stating that it is made from raw materials produced in Thailand	3.651
Average	**3.61**

5. EMPIRICAL RESULT

The estimations are carried out with 19 independent variables. They are divided into five models: all samples, generation Z, Y, X, and baby boomer. From a general investigation of all samples, shown in Table 4, the results reveal the statistical significance of several variables: PACK, TASTE, BEFT, NUR, SSQ, UND, AENVI, AGE, EDU, FMEM, GOV, and INC. These factors can affect respondents' preference on chips processed from local cassava. The awareness about generation behaviors and perspectives has generated interest among not only academic circle, but also the public and private sectors. This is because the finding would provide the useful information for strategizing communication channels to induce market landscape. The separate considering of each generation group provides rather different outcomes in which point out to the generation effect on local raw material produced, particularly cassava chips.

In generation Y and X models, most variables seem to perform similarly and consistent with the all-samples model. In contrast, generation Z model yields somewhat different results. This may reflect the differences in their characters, perception, belief, and behaviors compared to older generations. It must be noted that log-likelihood value and adjusted-R^2 of the regressions with the original form of continuous value of independent

variables show better estimation. Moreover, those two statistics also demonstrate that logit analysis is more appropriate specification compared to probit analysis in all estimations.

With reference to the performance of variables studied here, in most models, respondents who attach importance to products' packaging, nutrition, standard, safety, quality, and the benefits of local raw materials are more likely to pay extra for cassava chips. Contrarily, persons keen on the taste of products are less keen on spending more for these products. With the significance of UND, respondents who have understanding about local products and related issues are quite agreeable to pay a premium for local-made chips. This is consistent with Chancharoenchai and Saraithong (2022) and Jekanowski et al. (2000) who found that consumers' knowledge and discernment of the products can influence their purchases. The estimated relationship between respondents' age and their willingness to pay extra amount in this case is mostly reported positive. More senior persons tend to be more eager to pay further for the locally sourced cassava chips. Older age may come with higher or more stable revenue as well as more concerns about health and food safety, possibly resulting in the likeliness of paying extra amount for cassava chips. This result is supported by Winterstein and Habisch (2021), Jensen et al. (2021), and Giraud et al. (2005).

The negative explanatory power of the number of respondents' family member (FMEM) for the willingness to spend on cassava chips is mostly significant. Persons coming from large family, with high household expenses, they may not be so keen on spending more for such snacks as cassava chips. This finding is different from Muhammada et al. (2015) who found that individuals from bigger family tend to pay more for organic products. The positive significance of NUR points to respondents' recognition of the nutritional issues. When persons are aware of nutritional qualities, they would be happy to pay more for cassava chips with good nutrition. This is in line with Chancharoenchai and Saraithong (2021).

This study's result also shows the statistical significance of education in explaining the intention to additionally pay for cassava chips. Generally, respondents holding higher education are more likely to make an extra payment for these products. This result is consistent with Giraud et al. (2005). Another important aspect of this finding is that when looking more closely at separate estimations, the positive association between respondents' education and their willingness to pay is statistically appeared in the model of generation X and baby boomer. The significance that occurred only in the oldest two generation groups may indicate that the influence of education over people's buying decision is limited by individuals' generation-specific characters. The younger two generations, generation Y and Z, are the groups of persons who are quite independent and hardly stick to any conventional norms, including formal education. Hence, it is possible that their behaviors depend on their experiences and intuition regardless of their educational background.

The outcomes of the five estimated equations suggest the strong explanatory power of AENVI, which is statistically significant in four models. This variable shows, in the general model, the statistically positive relationship with the extra price respondents intend to spend on cassava chips. It indicates that, generally, people with awareness and concerns about environmental problems are probable to have higher willingness to pay in this case. This is consistent with Schneider and Francis (2005) and Dukeshire et al. (2011). However, looking more closely at specific generation groups, it can be seen that for generation Z and X, the estimations produce the negative relationship. This implies that although people in these two age groups are aware of environmental issues, they would not act by supporting locally sourced products to improve the situations.

Table 4 Estimation results of preference on local contents produced snack

Variables:	OLS Estimation				
	Sub-sample groups: Separated by Generation				
	All Samples	Generation Z	Generation Y	Generation X	Baby Boom
Constant	-0.234 ^{b} (0.12)	-8.164 ^{c} (3.37)	-0.027 (0.21)	-0.679 ^{a} (0.23)	0.499 (0.75)
PRICE	-0.016 (0.02)	-0.097 (0.25)	-0.022 (0.03)	0.003 (0.03)	-0.010 (0.08)
PACK	0.151 ^{a} (0.02)	0.305 (0.19)	0.132 ^{a} (0.03)	0.156 ^{a} (0.03)	-0.012 (0.09)
TASTE	-0.189 ^{a} (0.02)	0.132 (0.18)	-0.202 ^{a} (0.03)	-0.139 ^{a} (0.03)	-0.102 (0.09)
BEFT	0.380 ^{a} (0.02)	0.199 (0.14)	0.369 ^{a} (0.03)	0.386 ^{a} (0.03)	0.312 ^{a} (0.08)
NUR	0.055 ^{b} (0.03)	0.399 (0.31)	0.050 (0.04)	0.097 ^{a} (0.04)	0.008 (0.12)
SSQ	0.588 ^{a} (0.04)	-0.013 (0.53)	0.599 ^{a} (0.05)	0.534 ^{a} (0.06)	0.550 ^{a} (0.13)
UND	0.101 ^{a} (0.05)	-0.279 (0.39)	0.088 (0.07)	0.049 (0.07)	0.162 (0.20)
PECON	0.027 (0.02)	-0.214 (0.13)	0.017 (0.03)	0.060 ^{a} (0.03)	-0.089 (0.08)
PAG	-0.010 (0.02)	0.920 ^{c} (0.39)	-0.015 (0.02)	0.013 (0.03)	0.094 (0.09)
AENVI	0.027 ^{b} (0.01)	-0.643 ^{c} (0.33)	0.087 ^{a} (0.02)	-0.040 ^{c} (0.02)	-0.036 (0.06)
PLOC	-0.023 (0.03)	-0.092 (0.20)	0.019 (0.03)	-0.059 ^{b} (0.04)	-0.060 (0.14)
GFEM	-0.008 (0.00)	0.148 (0.17)	-0.008 (0.04)	-0.052 (0.04)	0.364 ^{a} (0.15)
AGE	0.004 ^{a} (0.03)	0.426 ^{c} (0.17)	-0.005 (0.00)	0.013 ^{a} (0.00)	0.006 (0.01)
EDU	0.062 ^{b} (0.01)	0.246 (0.20)	-0.011 (0.07)	0.088 ^{c} (0.05)	0.248 ^{a} (0.11)
FMEM	-0.017 ^{a} (0.05)	0.129 (0.09)	-0.015 (0.01)	-0.014 (0.01)	-0.058 ^{a} (0.03)
GOV	0.057 ^{a} (0.03)	NA	0.108 ^{a} (0.04)	0.020 (0.04)	-0.138 (0.13)
INC	-0.042 ^{c} (0.03)	NA	0.021 (0.04)	-0.082 ^{b} (0.04)	0.054 (0.11)
RACE	0.034 (0.04)	-0.832 ^{c} (0.39)	0.046 (0.04)	-0.024 (0.06)	0.313 ^{a} (0.13)
NE	-0.049 (0.12)	0.011 (0.32)	-0.069 (0.06)	-0.013 (0.05)	-0.005 (0.12)
# of obs.	1,000	23	498	407	78
Adj-R^2	0.782	0.968	0.778	0.817	0.827

Note: # of obs. and adj-R^2 denote the numbers of observation and adjusted R^2, respectively. NA means that data is not available. $^{a,\ b,\ c}$ represent the significant levels of $0.01, 0.05,$ and $0.10.$ Values in brackets are regression standard errors.

6. DISCUSSION AND CONCLUSION

The objective of this paper is to study the factors influencing consumers' purchase of cassava chips which is measured by their intent to spend on the products. The data for the analysis is from questionnaire surveys with Thai people during April-May 2022. The estimation of five different models is carried out using the OLS regression. These models are separately estimated according to the age differences of samples, consisting of all-samples, generation Z, Y, X, baby boomer. From these models' results, people in generation Y and X seem to behave similarly in terms of cassava chips purchases. On the other hand, younger persons in generation Z tend to act differently.

Moreover, the study presents an interesting finding on the environmental issues. The variable, AENVI, shows strong explanatory power in most models. Yet, the direction of the relationship between respondents' concerns for environmental issues and their willingness to pay is ambiguous. If we look at the overall model and their significance level, it can be seen that the positive relationship dominates. This indicates that apart from consumers' and products' characteristics, a good cause for the society can also encourage people's buying of chips made from domestically grown cassava.

As a result of the significance of AENVI and UND, both businesses and the government can implement appropriate strategies to develop the higher value cassava products. Businesses involved can attract more customers by communicating with the public

about the environmental-friendly quality of their products as well as build-up their good image. At the same time, the government should continue to promote environmental improvement as it can not only benefit the climate change situations but also help entrepreneurs relating to cassava chips gain more customers.

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