

Factors Affecting Consumers' Willingness to Pay for Functional Foods in Vietnam

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Factors Affecting Consumers' Willingness to Pay for Functional Foods in Vietnam

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Ordered probit model is used to analyze 11 independent factors, socio-demographic characteristics, family health condition, experience of functional food consumption and mass media impact those are presumed to affect the willingness to pay for functional food by Vietnamese consumers. Contingent valuation using the payment card method was used to elicit the premium that respondents are willing to pay for 2 popular functional food items which is selected from the pilot survey, Diabetes milk–functional food for diabetes patients and bone health milk–for general consumer. The outcome of this study is expected to provide initial but important information of factors leading to the willingness to pay for functional foods. It helps functional developers, marketers and Vietnamese authorities to develop a good health programs, marketing programs specifically for Vietnamese people.

INTRODUCTION

From its first appearance in Vietnam in 2000's until now, in such a short period, functional food market has been rapidly growing. With just only more than 10 items at the beginning, to date, there are 1,700 kinds of functional food available on the market produced by 1,000 domestic companies (Vietnam Association of Food Additives, 2010). The market rose 200% in the period of 2004–2010 (Vietnamnet, 2010). The marketing system is also rapidly developing, as of 2010 statistics, there are 700,000 sale agents of functional foods products.

As functional food is a special item that strongly affects human health, it is necessary to have special policy to control it. However, Vietnamese government does not keep pace with the rapid development of this market (Vietnamnet, 2010). So far, there is only one legal document regulating the functional food content, labeling, and quality. This document has shown many backwards in managing the market (Vietnamnet, 2010).

In term of marketing aspect, the most preferred and popular marketing method used is multi-level-marketing. A lot of questions have been raised by consumers and the authority, especially on the price to the end-users (CAND, 2010). According to a report by Vietnamnet (2010), for many functional food items, the price sold to the end consumers is usually 10 times more expensive than imported cost price. This problem is seemed from the lack of information and knowledge of consumers.

Besides, there have been very few comprehensive researches on functional food market. The Vietnam government has no special agency to control the market, and there is no official statistics data on functional food.

Producers and marketing companies are in lack of information about consumers' characteristics and consumption pattern/behaviors. It is needed to have more and more comprehensive researches to figure out the characteristic of Vietnam functional food market. Such kind of researches would shed more lights on this potential market as well as contribute to the improvement of government's management, companies' marketing strategies and consumers' benefits.

DATA SOURCE

Our survey area is conducted in City of Hanoi, the capital of Vietnam, with a population of 6.5 million people, living in 3,344 square kilometer. Per capita income is US\$ 1,900 (GSO, 2009), double of national average per capita income (US\$ 1,000). Our survey targets at people living in luxury apartment areas for the reason of income. Functional food is a luxury good, and thus its price is very much sensitive against income. We selected to send our questionnaire to 4 luxury apartment areas of Nhan Chinh (West), My Dinh (West), Linh Dam (South) and Ciputra (South). The survey was carried out through post mail. 4,000 questionnaires with portaged envelop were sent to the 4 selected areas, 1,000 copies per area. Recipients in the target area were randomly selected from 2010 Yellow Page Book (Telephone Book of Hanoi's household and company). 235 answers were collected and used as data input for this study.

METHODOLOGY

Willingness to pay for functional food

The theoretical frameworks is presented in Fig. 1 indicating factors groups that may have influence on the willingness to pay for functional foods.

This study uses Contingent Valuation Method to elicit Willingness to Pay for functional foods. Contingent valuation was originally used to value environmental and public goods but has been extended to the determina-

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tion of WTP for private goods especially those goods in which a market does not yet exist, i.e., non-market goods (Cate Nakaweesa Munene, 2006).

Contingent Valuation Method (CVM) by Hanemann (1984) creates a hypothetical market situation for a given good or service. It quantifies the value consumers confer to products by associating that value with the sum of money they are willing to pay (Kawagoe & Fukunaga, 2001). CVM researches need a specific survey design, especially when they inquire about WTP. They ask information about consumption behavior, risks perceptions and experiences, and socio-demographic information (Mitchell & Carson, 1989; Carson, 1999).

Before asking respondents, the researcher need to define the bid series with different price levels (premiums), starting with a “starting points”–minimum price. We can define bid series from the result of pilot survey (Cooper, 1993), random premiums definition (Gil *et al.*, 2000), etc.

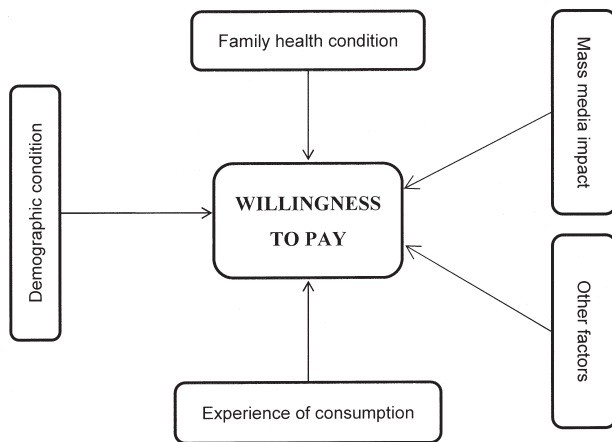


Fig. 1. Theoretical frameworks of groups of factors affecting willingness to pay for functional food.

Ordered Probit Regression

The relationship of willingness to pay for functional foods with above mentioned factors are express by:

$$WTP = \beta_0 + \beta_1 GENDER + \beta_2 CHILD + \beta_3 ADULT + \beta_4 HIGHERAGE + \beta_5 EDU + \beta_6 INCOME + \beta_7 EXPERIENCE + \beta_8 DISEASEHIS + \beta_9 CHECKUP + \beta_{10} MEDIAIMP + \beta_{11} CONCERN + \varepsilon$$

– β_k : The coefficient associated with the k^{th} variable ($k = 1, \dots, k$).

– ε_i : error component

The ordinal regression model is commonly presented as a latent variable model with a structural equation specified as, $y_i^* = x_i \beta + \varepsilon_i$

– y_i^* is a latent variable ranging from $-\infty$ to ∞ .

– ε_i is the function's error term

Long (1997) developed an equation to map y_i^* through observed variable y : $y_i = m$ if $\tau_{m-1} \leq y_i^* < \tau_m$ for $m = 1$ to

j where the τ 's are thresholds or cut-points.

The willingness to pay for functional foods therefore can be represented:

$$WTP = y_i = \sum \beta_k x_{ik} + \varepsilon_i$$

Where β_k is the coefficient associated with the k_{th} variable ($k = 1, \dots, k$). An increase in the value of the kth factor for a particular respondent will cause his or her WTP score to rise if $\beta_k > 0$ and fall if $\beta_k < 0$.

$$y_i = \begin{cases} 0 & \text{if } y_i^* = 0 \\ 1 & \text{if } 0 < y_i^* \leq \tau_1 \\ m & \text{if } \tau_{m-1} < y_i^* \leq \tau_m \\ 8 & \text{if } \tau_7 < y_i^* \leq \tau_8 \end{cases}$$

The possibility of observing $y_i = m$, of WTP for a given value of x_k is represented as:

$$\Pr(y_i = m | x_i) = F(\tau_m - \beta x_i) - F(\tau_{m-1} - \beta x_i)$$

– F : cumulative distribution function for ε_i

The ordered probit model assumes that ε_i is normally distributed with zero mean and variance equal to 1. After analyzing the regression model, we can find the coefficient β_k , and thus $\sum \beta_k x_{ik}$ for each individual in the sample. Calculation of these predicted probabilities and other statistical analyses were performed using Stata, version 11 (StataCorp, College Station, TX).

EMPIRICAL RESULTS

Willingness to pay for functional food

Two most popular foods to the respondent in the pilot survey were selected for our study. They are Bone Health Powder Milk and Diabetic Powder Milk.

Table 1. shows that about 96% respondents are willing to pay premium for Bone Health Milk. 20% respondents agree to pay \$7–9 the product (17%–50% premium), approximately 25% are willing to pay from \$11 to \$13 (100% premium), and about 36% respondents are willing to pay from \$15 to \$21 (150%–200% premium). 3

Table 1. Willingness to pay for Bone Health Milk

*Price	Number of response	Percent-age
\$7	38	16.2
\$9	48	20.4
\$11	30	12.8
\$13	29	12.3
\$15	23	9.8
\$17	21	8.9
\$19	18	7.7
\$21	19	8.1
	226	96.2
Price of regular milk	3	1.3
\$0	6	2.5
Total	235	100

* Price of a 400 gr can of diabetes powder milk; price of regular milk at the time of survey is approximately US\$6.

Table 2. Willingness to pay for diabetes milk

*Price	Number of response	Percentage
\$13	32	13.6
\$15	65	27.7
\$17	39	16.6
\$19	38	16.2
\$21	20	8.5
\$24	13	5.5
\$27	9	3.8
\$30	7	3.0
	223	94.9
Price of regular milk	6	2.5
\$0	6	2.5
Total	235	100

* Price of a 400 gr can of diabetes powder milk; price of regular milk at the time of survey is approximately US\$6.

consumers (1.2%) are not willing to pay any addition to the price of regular milk (\$6), meanwhile other 6 (2.5%) do not want to pay any money for the food.

The willingness to pay for Diabetic Milk is presented in Table 2. Approximately 95% respondents are willing to pay premium for Diabetic Milk. 28% respondents agree to pay \$15 (150% premium), 41% are willing to pay from \$17 to \$21 (equal to 280%–350% of the price of regular milk) and about 12% respondents are willing to pay from \$24 to \$30 (400%–500% price of regular milk). 6 consumers (2.5%) are not willing to pay any addition to the price of regular milk (\$6), meanwhile other 6 (2.5%) do not want to pay any money for Diabetic Milk, meaning they have no demand on it. Generally speaking, the willingness to pay for diabetic milk is skewed to the lower prices.

Ordered probit regression of willingness to pay for functional foods

The regression result is shown in Table 3. There are 4 coefficients statistically significant at 1% level. The first two are demographical factors, education of the respondent (EDU) and family's annual income (INCOME). The history of functional food (EXPERIENCE) consumption also positively influences the food. The last factor that significant is the concern of health condition and diseases (CONCERN).

Education of the respondent (EDUCATION) is hypothesized to be positively significant to willingness to pay for functional food.

In previous researches, M. H. Arnoult, A. E. Lobb, S. A. Chambers, W. B. Traill & R. Tiffin (2007) concluded that people have a higher education are however more willing to pay for strawberries sold with a pill supplement. Cate W. M. (2006) also concluded that education positively influence the willingness to pay for functional foods by US consumers. The research discusses that education is an important factor leading to higher knowledge on functional foods by consumer. And knowledge is one of the key factors of willingness to pay.

Abbott Saron D. (2005) in a publication concluded

that education plays a significant role in households purchasing healthy and functional food products. Analyses of more-educated (college-degreed) versus less-edu-

Table 3. Regression of willingness to pay for Diabetic Milk

WTPDIA	Coef.	Std. Err.
GENDER	0.036	0.144
CHILD	0.068	0.088
ADULT	0.046	0.066
HIGHERAGE	0.025	0.080
EDU	0.201***	0.058
INCOME	0.484***	0.056
EXPERIENCE	1.800***	0.478
MEDIAIMP	0.080	0.075
DISEASEHIS	0.173	0.145
CHECKUP	0.105	0.146
CONCERN	0.311***	0.049
Cut-point	Coef.	Std. Err.
/cut1	4.053	0.687
/cut2	5.087	0.692
/cut3	6.251	0.720
/cut4	6.978	0.737
/cut5	7.856	0.761
/cut6	8.475	0.777
/cut7	9.024	0.793
/cut8	9.632	0.817

Number of obs = 229; Log likelihood = -356.855;

Prob > chi2 = 0.0000

***, **, * denote statistically significant at 1%, 5% and 10% respectively.

Table 4. Regression of willingness to pay for bone health milk

WTPBHM	Coef.	Std. Err.
GENDER	-0.033	0.143
CHILD	0.128	0.087
ADULT	0.061	0.065
HIGHERAGE	0.881***	0.092
EDU	0.002	0.0568
INCOME	0.061	0.047
EXPERIENCE	-0.055	0.427
MEDIAIMP	0.135*	0.075
DISEASEHIS	0.246*	0.144
CHECKUP	-0.178	0.146
CONCERN	-0.025	0.047
Cut-point	Coef.	Std. Err.
/cut1	-0.860	0.638
/cut2	0.481	0.611
/cut3	1.280	0.614
/cut4	1.749	0.618
/cut5	2.247	0.624
/cut6	2.686	0.628
/cut7	3.120	0.633
/cut8	3.599	0.641

Number of obs = 229; Log likelihood = -417.300;

Prob > chi2 = 0.0000

***, **, * denote statistically significant at 1%, 5% and 10% respectively.

cated (no college degree) households indicated that more-educated households purchased healthier products than less-educated households.

There have been researches aiming at whether education has influence on functional food consumption. Suzanne Pelletier, Susan Kundrat and Clare M. Hasler (2003), conducted a research on 530 participants who receive educational kits to improve their knowledge on functional foods. The result was at least 74.9% intended to eat more tomatoes, grapes, oats, and functional foods.

For Vietnamese consumer, we predict that education decide the willingness to pay by two means. First, more educated people have better awareness of their health, they try to eat healthy foods and functional food. The second reason is maybe that more educated people have more knowledge of functional foods therefore they are more willing to pay for it.

Family annual income (INCOME) is another demographic factor that has impact on the willingness to pay for diabetes powder milk. This result is in line with previous researches in developed countries. Suzanne Pelletier, Susan Kundrat and Clare M. Hasler (2003) highlighted the importance of income to healthy functional food purchases. Higher income households (\$50,000 per year or more) across all household types purchased healthier products than lower-income households (less than \$50,000 per year).

Herath *et al.* (2008) discussed that level of income may also play a role in functional food consumption, but research data lack consistency. Some studies show that consumption of functional foods is associated with lower income households.

Ratapol Teratanavat and Neal H. Hooker (2005) concluded that education and income level affects preferences and food selections. Respondents with higher education levels are willing to pay more for these product attributes. Also, respondents with higher income levels tend to be willing to pay more, although the range of WTP estimates is relatively broad for all income levels.

Frequency or experience of functional food consumption (EXPERIENCE) is the third factor that influences the willingness to pay for diabetes milk. We have discussed in the introduction part of this thesis, functional food is a quite new product in Vietnam. We presume that the experience of functional food, their real experience maybe one of the key factor leading to willingness to pay for functional food. Because, experience tells consumer how good it is? Does it really work to help human health? How much it is worth paying? And so on.

The regression result showed that experience of functional food positively affects the willingness to pay for diabetic milk with a relatively high coefficient. It means that the more they are experienced, the more likely they pay for the food.

As there is no prior research on the experience of functional food consumption affecting willingness to pay for it, this is a new finding of this study.

The last factor that positively influences the willingness to pay for diabetic milk is the concern toward general health condition and other chronic diseases

(CONCERN).

In our study, we estimate respondent's health concerns on 4 main criteria: general health condition, bone health, hypertension and diabetes. The regression result shows that the concern toward these diseases is closely related to diabetic milk consumption.

Our result is in line with previous researches. For example, Cate N. M. (2006) reported that there is a significant impact of health concerns with the willingness to pay for functional foods. Jose Blandon, John Cranfield and Spencer Henson (2007) also concluded that high levels of concern about diet-related chronic diseases mean that Canadian consumers are likely to be receptive to new information about diet and health and to functional foods and natural health products that purport to provide health benefits.

The nature of bone health milk is rather "optional" or "preventive" and is a kind of "everyday food" for health improvement. It is opposite to diabetes milk which is rather for "cure" of diabetic patients therefore factors that affect WTP are different. The result of ordered probit regression for willingness to pay for Bone Health Milk is presented in Table 4.

The first factor that positively affects the willingness to pay for bone health milk is the number of higher age members (members aging over 50) in the respondent's family (HIGHERAGE). The reason is because people at this age have higher risk of bone problems. They tend to consume more calcium-rich foods; and milk is one of the best options.

HIGHERARE variable is closely related to consumer's age, presumed in our study. Because, Vietnamese families, consumer basically does not only represent his/her own consumption pattern but the whole family. They buy functional food not for them but other family members as well. By this mean, our study is also in line with previous studies which explain the relationship between age and willingness to pay for functional foods.

The second factor that has influence on willingness to pay for bone health milk is the mass media impact (MEDIAIMP). As previously mentioned in the hypothesis section of the study, we do not know whether mass media has a positive or negative impact on willingness to pay for functional foods; whether it helps to boost functional food consumption or just feed up consumers with the so-called "magic food" slogan. The regression result proved the mass media impact on consumers' willingness to pay for bone health milk.

The last factor that closely related to the willingness to pay for bone health milk is the disease history of family members (DISEASEHIS).

Family members' health problem history and current situation may significantly influence the consumption of functional food. Because once their family members face health problems, they would be more aware of measures for health improvement.

There are prior studies of this relationship. Ratapol Teratanavat and Neal H. Hooker (2005) reported that the experiences of certain chronic diseases such as cancer, heart disease are significant factors leading to will-

ingness to pay for functional tomato juice. The same result was observed in US (Cate Nakaweesea Munene, 2006).

CONCLUSION

96% respondents are willing to pay premium for bone health milk. They are willing to pay from 117% to 300% of the price of regular milk. For diabetic milk, approximately 95% respondents are willing to pay more, from 200% to 500% as much as regular domestic product.

Among demographic conditions, education and income have positive response to WTP for diabetes milk but no influence on bone health milk's. On the other hand, number of over 50 year-old members in the family has an effect on the willingness to pay for bone health milk. There are several reasons to explain this fact: the nature of bone health milk is basically for preventive purpose; bone health milk is already very popular food to urban consumers. They use it as a kind of everyday food.

One of our main hypotheses was that income has a high correlation with the willingness to pay for functional foods. The regression result shows that it significantly influences the willingness to pay for diabetic milk but neutral to the willingness to pay for bone health milk. It is because the price of bone health milk is relatively low, about one third of diabetic milk's. Therefore, the willingness to pay for bone health milk is less elastic to income change.

Experience of functional food positively affects the willingness to pay for diabetic milk with a relatively high coefficient. It means that the more they are experienced, the more likely they pay for the food. As there is no prior research on the experience of functional food consumption affecting willingness to pay for it, this is a new finding of this study.

Family health condition has different affects on WTP of each food. Concern of disease influences the WTP of diabetes milk meanwhile disease history leads to WTP of bone health milk. We can say that consumption of functional food for "cure" is correlated with consumers' health concern and consumption of functional food for "prevention" is closely influenced by disease history of consumer's family members.

The media impact affects the purchasing decision of "preventive" functional food. It showed a positive coefficient with Willingness To Pay of bone health milk.

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