

Analysis of factors affecting the consumption intention of processed sea crabs in big cities in Vietnam

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ABSTRACT— The research analyzes the current status of consumption of fresh and processed sea crabs in 3 big cities of Can Tho, Ho Chi Minh and Hanoi, and finds out the relationship among groups of factors affecting the customer intention of buying fresh and processed sea crabs by using Cronbach's Alpha test and Exploratory Factor Analysis (EFA). The analysis of 134 consumers shows that there is an average of 2.1 times/year of buying fresh crabs, 3.5kg/household/year of tomalley fat crabs, 5.1kg/household/year of male crabs, and 6kg/household/year of 1-pincer crabs (*cua xô*). Most consumers purchase fresh sea crabs from traditional markets to boil and cook hotpot. There are two groups of factors affecting the buy intention: *perception of nutrition and perception of convenience of use*. For processed sea crabs, 58.96% of the consumers have known, 17.16% have bought, and 68.6% have intended to buy. For canned crab meat, 43% of the customers have bought and supermarkets are the distribution channel that they buy the most, accounting for 47.83%. There are 3 groups of factors affecting the consumption intention of processed crabs: *perception of health, perception of price and accessibility, and perception of convenience of use*. These findings can help seafood processing companies introduce their processed sea crab products to market, thereby contributing to the effective of the development of the crab supply chain in the Mekong Delta.

KEYWORDS: processed sea crabs, consumption behavior, consumption intention

1. INTRODUCTION

Vietnam has gradually formed the system of an agro-forestry-fishery processing industry with over 7,500 units associated with export [15]. However, the seafood processing industry still faces many difficulties such as price increase and scarcity of raw materials. Products are not only consumed in the domestic market but also not met consumer tastes and product diversity [17]. In addition, the average income level of people in big cities has increased by 7.8%/year [15], thereby consumers with higher living standards often have high demands in consumption of goods in general and seafoods in particular. The basic needs are upgraded and the consumption habits of aquatic products are also changed due to the awareness of health protection and convenience. Therefore, the appearance of clean, safe and convenient processed products is inevitable [7]. Eating fresh sea crab products might cause many inconveniences. Moreover, processing crabs as a whole makes it not safe and hygienic as it is easy to prone to contamination from the crab feeding environment [14]. The trend of consuming processed foods, which helps consumers ensure on their quality, safety and hygiene, and convenient storage and processing, has become more and more popular. Hence, many processed products of sea crabs have been introduced in the market [18]. However, it accounts only for 1.76% of the total seafood output for domestic consumption and export, so it is still quite unfamiliar to consumers in Vietnam [19]. Therefore, in order to find solutions to increase the efficiency of the sea crab supply chain in the Mekong Delta as well as obtain insights of the customer demand in big cities in Vietnam, the research findings have great significance to develop processed sea crabs for the Vietnamese market. This article presents the consumption characteristics of consumers in fresh and processed sea crabs in big cities in Vietnam. It also finds out the factors affecting the consumption intention of fresh and processed sea crabs in order to provide

market insights and propose solutions for those who intend to do business in processed seafood products in Vietnam.

2. Research methodology

The research uses the combination of the *Theory of Reasoned Action* (TRA) and the *Theory of Planned Behavior* (TPB). In TRA, consumers' beliefs will affect their attitudes towards behaviors, then the attitudes to a behavior will affect their buying intentions rather than buying behaviors. Therefore, consumers' intentions are explained by attitudes while their buying behaviors are explained by intentions [3]. In TPB, behavioral intentions is a function of three factors: attitudes are conceptualized as beliefs about positive or negative consequences of the practiced behavior; normative beliefs as beliefs about the normative expectations of other people; and control beliefs as beliefs about the presence of factors that may enable or obstruct the performance of the behavior. It depends on the availability of resources and opportunities to perform behaviors [1], [2].

The group of factors of consumer attitudes on "perception of nutrition" is to be health, nutritious, uninfected and quality [4], [9], [18].

The group of factors of "perception of food hygiene and safety" is traceable, preservative-free, parasite-free, and non-allergenic [5], [10], [12].

The group of factors of "perception of other people's influence" is about the influence or preferences of relatives and friends, and the class of oneself and families [9], [13], [16].

The group of factors of "perception of accessibility" which refer the possibility of product purchasing such as ease of purchase, processing and storage, product diversity [6], [11], [12].

The group of factors of "perception of price" is about the comparison of market price and fresh products, affordable price [6], [9], [13].

2. Method of data collection

Firstly, the research analyzed the current situation of three major cities - Can Tho, Ho Chi Minh and Hanoi. Secondly, it conducted qualitative research from obtaining expert opinions to designing pilot questionnaires, revising it, and conducting an official survey. Through literature review, 22 variables were included, as the minimum sample size is 5 samples for 1 variable [8] so it is calculated by the formula: $N*5 + (N*5* 0.1) = 121$. To ensure reliability, the research conducts interviewed with housewives who both have and have not bought processed crabs by directly interviewing 150 people at home. There were 134 qualified surveys in terms of quality and quantity.

2.1 Method of data analysis

Cronbach's Alpha reliability coefficient was used to remove observed variables with low correlation with other observed variables (variables with total correlation coefficient less than 0.5 were removed). Exploratory Factor Analysis (EFA) was used to determine the correlation of groups. To qualify EFA analysis, the KMO coefficient is between 0.5 and 1, the Bartlett test is significant when p-value is less than 0.05 meaning that the factors are correlated, the Eigenvalue coefficient is greater than 1 and the total variance explained is greater than 50% [8].

4. Results

4.1 Characteristics of sea crab consumers in 3 big cities in Vietnam

Survey results of 134 consumers in 3 big cities in Vietnam show that the percentage of women accounts for 66%, the average number of members per household is 3.7, and the highest household member is 7. The average income of household is quite high (32.1 million VND/month); however, there are not only low income of 2.5 million VND/household/month but also high one of 200 million VND/household/month. The average amount for food is about 10 million VND (about 30% of income) (Table 1).

Table 1. Characteristics of sea crab consumers

Characteristics	Average	Standard Deviation	Min	Max
Age (year)	33.0	8.6	20.0	62.0
Family member (person)	3.7	1.4	1	9
Women (%)	65.7			
Education				
<i>Doctor</i>	0.75			
<i>Master</i>	7.46			
<i>Bachelor</i>	64.93			
<i>College</i>	8.96			
<i>Vocation training</i>	5.97			
<i>High school</i>	11.94			
Occupation (%)				
<i>Jobless</i>	3.7			
<i>Housewife</i>	4.5			
<i>Unskilled labor</i>	9.0			
<i>Officer</i>	79.9			
<i>Teacher</i>	2.9			
Household income (million VND/month)	32.1	28.1	2.5	200
Household expenditure on food (million VND/month)	10.2	9	1	70

Source: Results of the 2019 sea crab consumer survey, n=134

4.2 Characteristics of fresh sea crab consumers

Among 134 consumers of fresh crab, the average number of times per year is 2.1; however, some households still buy 12 times/year. Out of the 134 consumers, there are 72 households buying tomalley crab fat with an average volume of 3.5kg/household/year and the average amount of 1,454 thousand VND; there are 75 households buying male crabs (Y crabs) with an average volume of 5.1kg/household/year and 1,656 thousand VND; and there are 8 households buying 1-pincer crabs with an average of 6kg/household/year and 976 thousand VND.

Table 2. Characteristics of fresh sea crab customers

Characteristics	Average	Standard Deviation	Min	Max
Number of times buying crabs (times/household/year)	2.1	1.3	1	12
Percentage of each type of crabs (%)				
<i>Tomalley crab fat</i>	53.7			
<i>Male crabs</i>	56			
<i>1-pincer crabs</i>	6			
Purchase volume of each type of crabs (kg/household/year)				
<i>Tomalley crab fat</i>	3.5	2.8	1	20
<i>Male crabs</i>	5.1	2.9	0.5	13
<i>1-pincer crabs</i>	6	2.9	2	10
Amount to buy each type of crabs (1,000VND/household/year)				
<i>Tomalley crab fat</i>	1,454	1,040	280	6,420

<i>Male crabs</i>	1,656	1,042	175	5,030
<i>1-pincer crabs</i>	976	386	420	1,560

Source: Results of the 2019 sea crab consumer survey, n=134

Dishes are usually made by consumers as fresh crab boiling (37%), crab hotpot (33%), tamarind crabs (16%), salted crabs (9%), soup and other dishes (5%). Distribution channels where consumers often buy fresh sea crabs are traditional markets with the highest rate of 63.51%, followed by supermarket (17.57%), farming households (13.51%), wholesalers (3.08%), and internet (2.03%). Thus, eating habits affect the consumption trend of processed crab products as it is clearly shown that the dishes with higher percentage are popular, nutritious, easily prepared and suitable for all ages. Moreover, it should be noted the habit of going to the traditional market in Vietnam when choosing the distribution channel of fresh crabs.

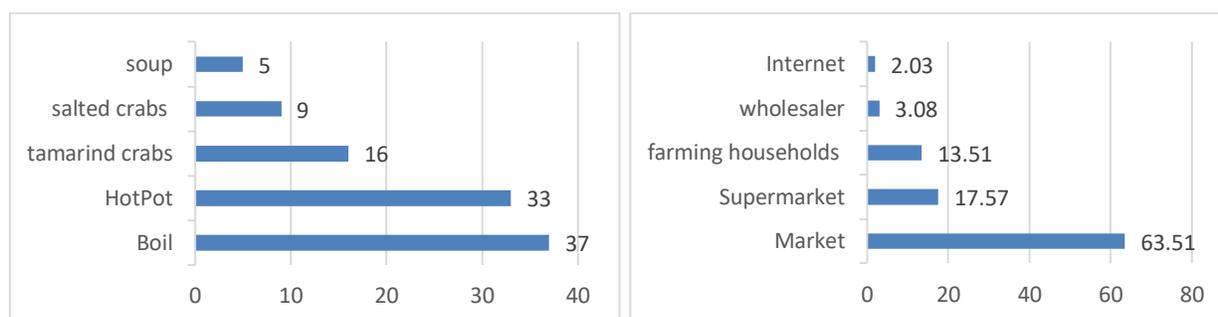


Figure 1: Dishes and distribution channels of fresh crabs

4.3 Characteristics of processed crab customers

The percentage of consumers who have heard/known about processed crabs is 58.96%. While 79 people who have heard/known about these products, there are only 23 people who have bought them, accounting for 17.16%. Some of consumers who have known but not bought the products are likely not to find places to sell or not familiar with processed crabs. The percentage of consumers intending to purchase processed crabs accounts for 68.66% (Table 5). It shows that consumers are willing to buy processed crab if the demand is satisfied.

Table 5 Percentage of consumers understanding and consuming processed sea crabs in Vietnam

Criteria	Number of people	Percentage (%) (n=134)
Respondents have never heard of processed crabs	55	41
Respondents have never bought processed crabs	111	83
Respondents do not intend to consume processed crab in the future	42	31

Consumers in big cities often choose to buy processed crabs such as canned crab meat, canned tomalley fat crabs, crab cakes and processed crab sticks (Figure 2). In which, crab meat is the most chosen by consumers, accounting for 43%. It is understandable as crab meat is popular and easy to eat, there are many different ways of cooking as boiling, steaming or cooking soup. Besides, consumers also use a variety of processed crabs such as crab cakes (35%), followed by crab fat and finally processed crab sticks. Supermarkets are the most chosen by consumers, accounting for 47.83%, followed by traditional markets with 30.43%, other locations (*marketing staff, fairs*) with 13.04%, internet (4.35%) and processing facilities (4.35%). While customers are familiar with buying food at supermarkets as a daily habit, with convenience, variety of foods and clear origins, they also go to the traditional markets frequently. Its implication is that a large amount of food are provided in Hanoi, Ho Chi Minh City and Can Tho through a system of supermarkets and large trade centers

such as Big C, Lotte, Vinmart, Bach Hoa Xanh.

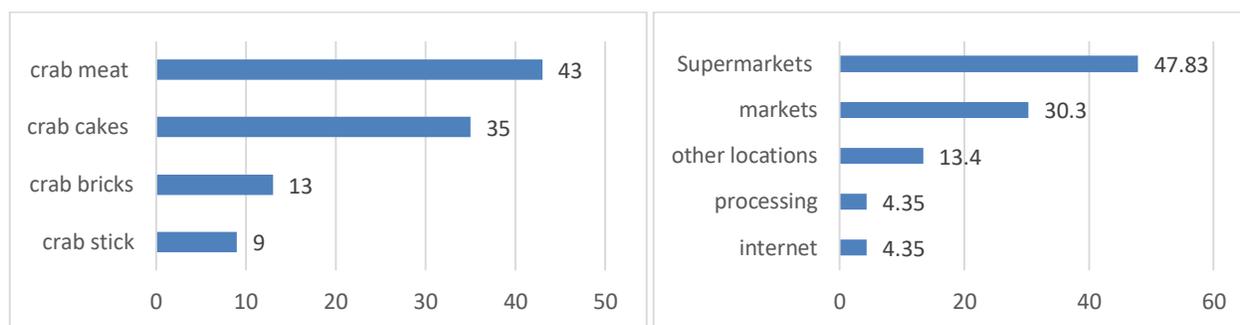


Figure 2: Types and distribution channels of processed crabs

Source: Results of the 2019 sea crab consumer survey, n=134

4.4 Analysis of factors affecting the consumption intention of fresh sea crabs in big cities in Vietnam

The results of EFA showed that the KMO coefficient of 0.675 satisfied the suitability of factor analysis, the Prob>chi2 coefficient = 0.000 showed that the observed variables were significantly correlated with each other in the population, so the observations are suitable for factor analysis. Cumulative variance is 78.5% suitable for factor analysis. From the initial four groups of factors with 13 observed variables, through factor analysis with Principal Component Analysis and Varimax rotations, four groups of factors were created. The results of the factor analysis are as follows:

Table 3: Matrix of factors affecting the decision of purchasing fresh sea crabs

Observed variables	Factors			
	1	2	3	4
1. Fresh sea crabs with freshness	0.75			
2. Fresh sea crabs with high minerals	0.74			
3. Fresh sea crab with high quality of crab meat	0.83			
4. Fresh sea crabs have better taste than canned crab products	0.77			
5. Fresh sea crabs do not contain toxic substances		0.81		
6. Fresh sea crabs are traceable		0.78		
7. Fresh sea crabs do not contain preservatives		0.56		
8. Fresh sea crabs do not contain parasites		0.71		
9. Fresh sea crabs do not contain allergenic substances		0.69		
10. Fresh sea crabs with a wide range of products			0.89	
11. Fresh sea crabs can be fought and bought easily			0.79	
12. Fresh sea crabs are convenient for processing				0.64
13. Fresh sea crabs are easy to consume after processing				0.86
KMO coefficient	0.675			

Source: Results of processed data of the 2019 crab consumer survey, n=134

The highest average rating was the group of factors of perceived nutritional needs (4.2), followed by the perception of convenience of use of 3.7, of accessibility (3.3), and the lowest was the group of factors of food hygiene and safety with 3.1.

Table 4 Group of factors affecting the consumption intention of fresh sea crabs

Group of factors	Factors	Average	Standard Deviation	Evaluation **
T1 (1-4)	Perception of nutrition	4.2	0.6	Influential
T2 (5-9)	Perception of food hygiene and safety	3.1	0.7	Neutral
T3 (10-11)	Perception of accessibility	3.3	0.7	Neutral
T4 (12-13)	Perception of convenient of use	3.5	0.8	Influential

Notes: ** Evaluation is based on a 5-point Likert scale: 1 - 1.8: not at all influential/strongly disagree; 1.81 - 2.6: not influential/disagree; 2.61 - 3.4: neutral; 3.41 - 4.2: influential/agree; 4.21 - 5: extremely influential/strongly agree

4.5 Analysis of factors affecting the consumption intention of processed sea crabs in big cities in Vietnam

Out of 22 statements (5-level Likert scale) on the factors affecting the consumption intention of processed sea crabs, there are 19 qualified statements. The results of EFA analysis (Table 3) showed that 5 groups of factors were formed and the analysis results were appropriate (KMO, Kaiser-Meyer-Olkin was $0.85 > 0.5$) and qualified (Engenvalue was $1.06 > 1$) and the total variance explained was $60.95 > 50$. Value of Prob $> \chi^2 = 0.0066 < 0.05$ (significant level of 5%). Therefore, it showed that the observed variables were related to each other [8].

Table 3: Matrix of factors affecting the consumption intention of processed sea crabs

Observed variables	Factors				
	1	2	3	4	5
1. Processed crabs do not contain toxic substances	0.77				
2. Processed crabs have traceability	0.53				
3. Processed crabs do not contain preservatives	0.79				
4. Processed crabs do not contain parasites	0.56				
5. Processed crabs do not contain allergenic substances	0.53				
6. Processed crabs ensure consumers' health		0.53			
7. Processed crabs ensure enough nutrition for health		0.69			
8. Processed crabs are standardized so good for health		0.63			
9. Processed crabs are safer as no contamination from crab ropes		0.68			
10. Consumption of processed crabs reduces the risk of being poisoned from the environment		0.79			
11. Price of processed crabs is important to me			0.73		
12. Price of processed crabs is higher than of fresh crabs			0.73		
13. Processed crabs can be fought and bought easily			0.54		
14. Processed crabs are easy to prepare different dishes			0.50		
15. My family member wants to taste processed crabs				0.82	
16. My family has a habit of eating processed seafood				0.80	
17. I feel that eating processed crabs will show my status				0.69	
18. Processed crabs are easily stored					0.65
19. Processed crabs have a wide range of products					0.70
Cumulative rate of total variance	15.7	14.9	11.7	11.1	9.7
Eigenvalue		1.07			
KMO coefficient		0.85			

Source: Results of processed data of the 2019 crab consumer survey, n=134

The group of factors of “perception of nutrition”; while it was the highest average rating of 4.2 for fresh sea crabs, it was 3.6 for processed sea crabs. Thus, it showed that the customer awareness of this factor group affected the purchase decision of fresh sea crabs as well as processed sea crabs.

The group of factors of “perception of food hygiene and safety”; while the average rating was 3.1 for fresh sea crabs, it was 3.3 for processed sea crabs. Thus, it showed that the perception of consumers on this factor group was at the neutral level.

The group of factors of “perception of accessibility”; for fresh sea crabs, the average rating was 3.3 indicating that this group was neutral. Meanwhile, the average rating was 3.7 for processed crabs showing that consumers’ perception of this factor group affected their decision to buy processed sea crabs.

The group of factors of “perception of convenience of use”; while the average rating was 3.5 for fresh sea crabs, it was 3.8 for processed sea crabs. Thus, it showed that the customer awareness of this factor group affected the purchase decision of fresh sea crabs as well as processed sea crabs.

The group of factors of “perception of other people’s influence”; for fresh sea crabs, this group was not included because fresh sea crab products are popular and commonly used in daily life, so this group had no impact. Meanwhile, the average rating was 2.8 for processed sea crabs. Thus, it showed that the customer perception of this factor group was neutral and for reference only.

Table 4 Group of factors affecting the consumption intention of fresh and processed sea crabs

Group of factors	Factors	Average	Standard Deviation	Evaluation **
Group of factors on fresh sea crabs				
T1 (1-4)	Perception of nutrition	4.2	0.6	Influential
T2 (5-9)	Perception of food hygiene and safety	3.1	0.7	Neutral
T3 (10-11)	Perception of accessibility	3.3	0.7	Neutral
T4 (12-13)	Perception of convenience of use	3.5	0.8	Influential
Group of factors on processed sea crabs				
N1 (1-5)	Perception of food hygiene and safety	3.3	0.7	Neutral
N2 (6-10)	Perception of nutrition	3.6	0.6	Influential
N3 (11-14)	Perception of price and accessibility	3.7	0.6	Influential
N4 (15-17)	Perception of other people’s influence	2.8	0.7	Neutral
N5 (18-19)	Perception of convenience of use	3.8	0.5	Influential

Notes: ** Evaluation is based on a 5-point Likert scale: 1 - 1.8: not at all influential/strongly disagree; 1.81 - 2.6: not influential/disagree; 2.61 - 3.4: neutral; 3.41 – 4.2: influential/agree; 4.21 – 5: extremely influential/strongly agree

5. Conclusion

The research designs a scale of factors affecting the consumption intention of fresh sea crabs including 13 observed variables. In which, the group of factors of perceived nutritional needs and convenience of use is assessed as affecting the purchase decision of fresh sea crabs. Therefore, in order to develop the value chain of fresh sea crabs from farmers to consumers, it is necessary to shorten the storage time and it is very difficult for fresh crab products. Meanwhile, the factors affecting the consumption intention of processed sea crabs include 19 observed variables. With consumers’ expectations are about the perception of nutrition, of reasonable prices and accessibility, and of convenience in use. As a result, in order to develop the market of processed crabs, it is necessary to ensure that the products are nutritious, harmless, traceable, affordable, found and bought easily, diverse in weight, and convenient for processing and storage.

6. REFERENCES

[1] Ajzen (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211:

- [2] Ajzen (2020). The theory of planned behavior: Frequently asked questions. *Human Behavior Emerging Technologies*, 2: 314-324.
- [3] Fishbein and Ajzen (1977). *Belief, attitude, intention, and behavior: An introduction to theory and research*.
- [4] Harsuko, Riniwati, Harahab Nuddin and Carla T Yohana (2017). Analysis of Indonesian crab export competitiveness in international market. *International Review of Management Marketing*, 7: 23-27.
- [5] Higuchi, Angie, Jorge Dávalds and Martín Hernani-Merind (2017). Theory of planned behavior applied to fish consumption in modern Metropolitan Lima. 37: 202-208.
- [6] Tuu, H. H, Svein O. O, Thao, D. T and Anh, N. T. K (2008). The role of norms in explaining attitudes, intention and consumption of a common food (fish) in Vietnam. 51: 546-551.
- [7] Trang, H. T. D (2015). Cold supply chain: A case of Vietnam. *Journal of International Economics and Management*, 78, Issue 78 (2015): 78-85.
- [8] Trong, H and Ngoc, C. N. M (2008). *Research data analysis with SPSS*. Hong Duc Publishing House.
- [9] Honkanen, P and Young (2015). What determines British consumers' motivation to buy sustainable seafood? *British Food Journal*.
- [10] Manus, A, W Hunt, J Storey, J McManus S and Hilhorst. (2014). Perceptions and preference for fresh seafood in an Australian context. *International Journal of Consumer Studies*, 38(2), 146-152.
- [11] Ngoc, C. N. M & Pham, T. N. (2013). Analysis of factors affecting the decision of fresh food consumers in Ho Chi Minh City selecting the supermarket channel. *Journal of Development & Integration*, No. 10 (20).
- [12] Hung, N. T (2013). Factors affecting food consumers' choice in Vietnam. *Journal of Science - An Giang University*, No. 01 (2013): 48-56.
- [13] Olsen, S. O (2004). Antecedents of seafood consumption behavior: An overview. *Journal of aquatic food product technology*, 13: 79-91.
- [14] Que, P. T. T (2005). *Processing technology of seafood*. Can Tho Geography Publishing House.
- [15] General Statistics Office. (2019). *Socio-economic situation*.
- [16] Thuan, N. V & Danh, V. T (2011). Analysis of factors affecting consumption behavior of safe vegetables in Can Tho city. *Scientific Journal of Can Tho University*, 17b 113-119
- [17] Hoang, T. T (2020). Competitiveness of Vietnamese seafood exporters. *Economic Development Journal*, 28-33.
- [18] Uswatun, Khasanah, Huang Wen Chi and Asmara Rosihan. (2019). Indonesian frozen and processed crab export performance and competitiveness analysis. *Agricultural Socio-Economics Journal* 19: 165-171.

[19] VASEP (2019). Vietnam Fisheries Trade Statistics. Ha Noi.



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