

## Consumers' Evaluation of "Ise-Shima" and "Ama" through a Focus on Distance from Consumption Area

Takahiro MATSUI<sup>†</sup>, Mami HIROSE\* and Fukuji YAMADA\*\*

Tokyo University of Marine Science and Technology / \*Former undergraduate student of Mie University / \*\*Mie University, graduate school

E-mail : <sup>†</sup>t-matsui@m.kaiyodai.ac.jp

### **【abstract】**

This study uses choice experiments to clarify how high a WTP consumers have for Ise-Shima products and *Ama* hand-picked products relative to ordinary marine products. In addition, the regression analysis declared the consumer trait that is indicative of a high WTP for Ise-Shima products. From the results of the choice experiments, the WTP for 15 g of Ise-Shima dried *Hijiki* is 44.4 yen higher than for the domestic products, and *Ama* hand-picked products have 38.3 yen higher WTP than ordinary products. In addition, the results of the regression analysis show that the WTP for Ise-Shima products (*Hijiki*) was found to be related to factors such as age, household income, preference, advertisement awareness, shopping frequency, Japanese food frequency and distance to Ise-Shima. Regarding distance, in particular, the relationship is not simple as "the WTP decreases as the distance becomes physically longer". It suggests that other influences are controlled and attention is paid only to the effect of distance, "the WTP can increase as the distance lengthens." On top of that, other factors such as the awareness of advertisements on localities affect WTP. As a result, "the WTP becomes higher if the distance shortens" is a relationship that exists.

### **【keywords】**

Ise-Shima, *Ama*, consumers' evaluation, WTP

## 1. Introduction

In recent years, fisheries in Mie Prefecture have faced critical issues, such as a decline in resources, price stagnation, and the aging of fishermen. In these circumstances, the strengths of the marine products produced in Mie Prefecture must be clarified. As part of this clarification, this research analyzes the brand value of the

“Ise-Shima” and “*Ama*” —traditional Japanese woman divers—. In other words, we investigate how consumers evaluate these brands. We also examine how distance affects brand values.

Mie Prefecture, especially the Ise-Shima region, attracted significant attention because of the 62nd *Shikiner-Sengu* (the relocation of the Ise Grand Shrine) held in October 2013 and the 42nd Summit Conference (Ise-Shima Summit) in May 2016. In addition, *Ama* attracts significant attention through a TV drama that was broadcast from April to September 2013. Because Mie Prefecture has approximately half of the *Ama* population, how we utilize these advantages under the severe conditions in the marine industry is seemingly important.

In these circumstances, this study clarifies how much consumers are willing to pay for Ise-Shima marine products (Ise-Shima products) and those harvested by *Ama* (*Ama* harvested products) relative to the other marine products<sup>(1)</sup>. Furthermore, this research also reveals the characteristics of people who have high willingness to pay (WTP) for the Ise-Shima products.

In the next section, we measure marginal willingness to pay (MWTP) for Ise-Shima products and *Ama* harvested products through a choice experiment. In Section 3, this research uses a regression analysis to examine the traits of consumers with a high WTP for Ise-Shima products relative to ordinary products. In Section 4, a discussion, a summary, and future tasks are provided.

## 2. Value of Ise-Shima and *Ama*; measurement through choice experiment

### 2-1. An overview

Matsui *et al.* (2015) conducted choice experiments on university students to measure the MWTP for Ise-Shima products and *Ama* harvested products. Seaweed products (15 g dried *Hijiki*, *Sargassum fusiforme*) were analyzed, using the attributes and levels shown in Table 1. There was a significant increase of WTP both in Ise-Shima products and *Ama* hand-picked products. Approximately 10 yen MWTP was shown as the result,

Table 1 Attributes and levels in Matsui *et al.* (2015)

Attribute	Levels			
Price	98 yen	128 yen	158 yen	188 yen
Locality	Ise-Shima	Mie	Japan	Korea
Producer/Method	<i>Ama</i> hand-picked seaweed		Ordinary seaweed	

Note: The same attributes and levels are used in this research.

Consumers' Evaluation of "Ise-Shima" and "Ama" through a Focus on Distance from Consumption Area

which was generally considered to be fine. Thus, we decided to adopt seaweed products (15 g dried *Hijiki*) for the current study, using the same attributes and levels as in Matsui *et al.* (2015).

In October 2014, choice experiments were conducted on the people registered with Macromill, Inc. The other items mentioned in Section 3 were also conducted together. The subjects were consumers in five prefectures: Aichi, Mie, Nara, Kyoto, and Osaka. From each prefecture, 90 people (450 in total) were categorized by gender and generation (20s, 30s, 40s, 50s, and 60s) based on the population ratio<sup>(2)</sup>.

To create a profile, the L16 orthogonal table was used. The subjects selected the most desirable alternative among four, product A, product B, product C (15 g dried *Hijiki*), and "not buying any", 16 times repeatedly. Figure 1 is part of the profile actually used (displayed on the web)<sup>(3)</sup>.

## 2-2. Results

Table 2 shows the results of the estimation using the conditional logit model implemented with the Statistical Computing Environment R "survival" package. Based on this result, the MWTP for each attribute was estimated. In the estimation, the standards were fixed: the locality is Japan and the producers and methods are ordinary seaweed.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="background-color: #cccccc;">Product A</th></tr> <tr><td style="background-color: #cccccc;">Locality</td></tr> <tr><td>Ise-Shima</td></tr> <tr><td style="background-color: #cccccc;">Producer/method</td></tr> <tr><td>Ordinary harvested seaweed</td></tr> <tr><td style="background-color: #cccccc;">Price</td></tr> <tr><td>158 yen</td></tr> </table>	Product A	Locality	Ise-Shima	Producer/method	Ordinary harvested seaweed	Price	158 yen	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="background-color: #cccccc;">Product B</th></tr> <tr><td style="background-color: #cccccc;">Locality</td></tr> <tr><td>Mie Pref.</td></tr> <tr><td style="background-color: #cccccc;">Producer/method</td></tr> <tr><td><i>Ama</i> hand-picked seaweed</td></tr> <tr><td style="background-color: #cccccc;">Price</td></tr> <tr><td>188 yen</td></tr> </table>	Product B	Locality	Mie Pref.	Producer/method	<i>Ama</i> hand-picked seaweed	Price	188 yen	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="background-color: #cccccc;">Product C</th></tr> <tr><td style="background-color: #cccccc;">Locality</td></tr> <tr><td>Mie Pref.</td></tr> <tr><td style="background-color: #cccccc;">Producer/method</td></tr> <tr><td>Ordinary harvested seaweed</td></tr> <tr><td style="background-color: #cccccc;">Price</td></tr> <tr><td>128 yen</td></tr> </table>	Product C	Locality	Mie Pref.	Producer/method	Ordinary harvested seaweed	Price	128 yen	<div style="border: 1px solid black; padding: 20px; min-height: 100px;"> <p>I buy none of them</p> </div>
Product A																								
Locality																								
Ise-Shima																								
Producer/method																								
Ordinary harvested seaweed																								
Price																								
158 yen																								
Product B																								
Locality																								
Mie Pref.																								
Producer/method																								
<i>Ama</i> hand-picked seaweed																								
Price																								
188 yen																								
Product C																								
Locality																								
Mie Pref.																								
Producer/method																								
Ordinary harvested seaweed																								
Price																								
128 yen																								

Figure 1 Example profile

Table 2 Estimation results (conditional logit model)

	Coefficient	t-value	p-value	MWTP
Constant term	3.68	39.3	0.00	
Price	-2.58×10 <sup>-2</sup>	-39.8	0.00	
Ise-Shima products	1.15	20.9	0.00	44.4
Mie products	0.646	12.1	0.00	25.0
Korean products	-2.16	-25.3	0.00	-83.7
<i>Ama</i> hand-picked products	0.989	26.2	0.00	38.3

All items are significant at the 1% level. The WTP for 15 g of Ise-Shima dried *Hijiki* is 44.4 yen higher than that of domestic products. The WTP for *Ama* hand-picked products is 38.3 yen higher than that of products produced by the ordinary method. According to similar research in Matsui *et al.* (2015) on students, the MWTP of the Ise-Shima dried *Hijiki* is 9.39 yen and of the *Ama* hand-picked products is 8.19 yen. This indicates that the MWTP of the ordinary consumers is much higher than that of students<sup>(4)</sup>.

### 3. Characteristics of people with high willingness to pay for Ise-Shima products

#### 3-1. An overview

In the previous section, general consumers were shown to have a high MWTP for Ise-Shima products and *Ama* hand-picked products. In this section, we clarify the traits of consumers with a higher WTP for Ise-Shima products relative to ordinary marine products<sup>(5)</sup>.

Oura (2007) analyzed fruits and vegetables from the viewpoint of production and locality marketing. Regarding the place of origin display, he concluded that “(1) the place of production close to the point of consumption is highly evaluated, and (2) locality with special brand image is highly evaluated” (p.127). By using a choice experiment, this finding revealed consumers’ WTP for various agricultural products (petit tomatoes, green onions, broccoli, and onions) from different localities (Chiba, Saitama, Ibaraki, Gunma, Aichi, Hyogo, Kumamoto, Saga, Hokkaido, Korea, China, and the United States) for consumers in specific areas (Tokyo, Kanagawa, Chiba, and Saitama). However, the study did not clearly analyze the impact on consumers’ evaluation based on the distance between the place of production and the consumers.

Therefore, in this section, we ask the WTP for the marine products harvested in the specific area (Ise-Shima) for consumers from different areas. We used regression analysis to determine how distances from the producing area and other personal attributes influence WTP. To reveal each consumer’s WTP, questionnaires in CVM format (a payment card method) are provided, in addition to the items of the choice experiment mentioned in the previous section.

First, as previously described, the WTP for Ise-Shima products is necessary as an explained variable. The subjects answered the following question: “How much can they pay within 100-160 yen for 15 g of Ise-Shima dried *Hijiki* given that ordinary domestic *Hijiki* is 120 yen?<sup>(6)</sup>”. Table 3 indicates the items used as explanatory variables. In

Consumers' Evaluation of "Ise-Shima" and "Ama" through a Focus on Distance from Consumption Area

Table 3 List of explanatory variables

	Name of variables	Description
(1)	Age	Age
(2)	Sex	Sex
(3)	Children	Have children or not
(4)	Household members	Number of people per household
(5)	Household income	Household income
(6)	<i>Hijiki</i> experience	Have ever eaten <i>Hijiki</i> or not
(7)	<i>Hijiki</i> preference	Like <i>Hijiki</i> or not
(8)	Visitation	Have been to Ise/Shima/Toba before or not
(9)	Ads awareness	Usually aware of advertisements of Ise-Shima and Toba
(10)	Frequency of Kintetsu	Frequency of use of Kintetsu trains and buses
(11)	Shopping frequency	Frequency of going grocery shopping at supermarkets
(12)	Japanese food frequency	Frequency of eating Japanese food for dinner
(13)	Hokkaido/Tohoku	Origin of respondents
(14)	Kanto	
(15)	Kinki	
(16)	Chugoku/Shikoku	
(17)	Kyusyu/Okinawa	
(18)	Aichi	Residency
(19)	Nara	
(20)	Kyoto	
(21)	Osaka	
(22)	Distance	Direct distance between the residential city/town and Ise City (km)

addition to the general (age, sex, and income) and the geographical (distance, origin, and residential area) variables, items that may affect the food habits and evaluation of Ise-Shima are added.

For each of these items, answers were obtained in choice and written formats, as indicated in Table 4 (middle column). From rows (1) to (12), the explanatory variables are shown in Table 4 (right column). The dummies for the origin and the residential prefectures, as in (13) to (21), are based on the Chubu area and Mie Prefecture (all 0). The explanatory variables (22) —the distances— are measured from Ise City Hall to each city/town/village office of the residential areas using the *Google* maps distance measurement tool.

### 3-2. Results

Table 5 shows the results of the estimation using the Tobit model implemented in the

Table 4 Alternatives/answer format and variables

	Alternatives/answer format	Variables
(1) Age	Written by number	Age
(2) Sex	Male	0
	Female	1
(3) Children	No	0
	Yes	1
(4) Household members	Written by number	Number of people
(5) Household income	Less than 2 million yen	1
	From 2 million yen and more to less than 4 million yen	2
	From 4 million yen and more to less than 6 million yen	3
	From 6 million yen and more to less than 8 million yen	4
	From 8 million yen and more to less than 10 million yen	5
	From 10 million yen and more to less than 12 million yen	6
	From 12 million yen and more to less than 14 million yen	7
	From 14 million yen and more to less than 16 million yen	8
	From 16 million yen and more to less than 18 million yen	9
	From 18 million yen and more to less than 20 million yen	10
	20 million yen and over	11
(6) <i>Hijiki</i> experience	I have eaten <i>Hijiki</i> .	0
	I have never eaten <i>Hijiki</i> .	1
(7) <i>Hijiki</i> preference	I have not eaten <i>Hijiki</i> ./I am not sure.	0
	I don't like <i>Hijiki</i> .	1
	I don't prefer <i>Hijiki</i> .	2
	It's difficult to say.	3
	I prefer <i>Hijiki</i> .	4
	I like <i>Hijiki</i> .	5
(8) Visitation	I have never visited.	0
	I have visited.	1
(9) Ads awareness	I have never seen the advertisements./I have never noticed the advertisements.	1
	I seldom see the advertisements./I seldom notice the advertisements.	2
	I have seen the advertisements.	3
	I sometimes see the advertisements.	4
	I frequently notice the advertisements.	5
(10) Kintetsu	(10) I don't use Kintetsu. (11) I don't go shopping.	0
(11) Shopping	(12) I don't eat Japanese food.	
(12) Japanese food	Once a week or less	1
	Two to three times a week or more	2

Consumers' Evaluation of "Ise-Shima" and "Ama" through a Focus on Distance from Consumption Area

(13) – (17) Origin	Written name of prefecture	0 (Chubu area)
		1 (Specified areas)
(18) – (21) Residence	Written name of prefecture	0 (Mie)
		1 (Specified prefectures)
(22) Distance	Written name of residence	Distance (km)

Table 5 Result of estimation (Tobit model)

	Coefficient	t-value	p-value
Intercept 1	57.2	6.16	7.26×10 <sup>-10</sup>
Intercept 2	2.91	76.7	2.00×10 <sup>-16</sup>
Age	0.151	1.85	0.0645
Sex	1.95	1.00	0.318
Children	0.272	0.114	0.909
Household members	0.261	0.332	0.740
Household income	1.01	1.79	0.0737
<i>Hijiki</i> experience	38.1	3.26	1.11×10 <sup>-3</sup>
<i>Hijiki</i> preference	5.66	5.38	7.37×10 <sup>-8</sup>
Visitation	2.58	0.743	0.458
Ads awareness	2.04	1.93	0.0539
Frequency of Kintetsu	2.64	1.61	0.107
Shopping frequency	3.69	2.26	0.0242
Japanese food frequency	5.22	2.20	0.0276
Hokkaido/Tohoku	12.8	1.26	0.209
Kanto	4.26	0.686	0.493
Kinki	0.628	0.165	0.869
Chugoku/Shikoku	0.470	0.0690	0.945
Kyusyu/Okinawa	-6.94	-1.27	0.203
Aichi	-3.42	-0.575	0.566
Nara	-6.03	-1.48	0.140
Kyoto	-3.49	-0.600	0.549
Osaka	-8.11	-1.59	0.112
Distance	0.109	1.81	0.0710

"VGAM" package of the Statistical Computing Environment R<sup>(7)</sup>.

Both *Hijiki* experience and *Hijiki* preference were significantly positive at the 1% level; both shopping frequency and Japanese food frequency were significantly positive at the 5% level; and age, household income, awareness of advertisements, and distance are all positive and significant at the 10% level. These results indicate that those who are aged, have high household incomes, like *Hijiki* (or have never eaten *Hijiki*), often see advertisements for Ise, Shima, and Toba, frequently go grocery shopping, often eat Japanese style dinners, and live farther from Ise-Shima have a higher WTP for *Hijiki* from Ise-Shima<sup>(8)</sup>.

## 4. Discussion and Conclusion

### 4-1. Discussion

The result of the choice experiment in Section 2 indicated that consumers have a higher WTP for Ise-Shima marine products and *Ama* hand-picked products than ordinary products. In addition, the results of the regression analysis in the previous section indicated that, age, household income, preference, advertisement awareness, shopping frequency, Japanese food frequency, and distance to Ise-Shima have a relationship to the WTP for Ise-Shima marine products.

The WTP for these marine products of general consumers is significantly higher than that of students relative to Matsui *et al.* (2015), as shown in the result of the choice experiment in Section 2. This result is consistent with the result of the regression analysis in the previous section. In other words, consumers are older and have higher incomes than students.

The results of the regression analysis in the previous section indicate that consumers who are older, have higher household incomes, like *Hijiki*, frequently notice advertisements, go shopping more frequently, and eat Japanese foods more often are generally considered to have a higher WTP for Ise-Shima products. However, consumers who reside farther from the production area have a higher WTP for these marine products. These results seem inconsistent with Oura (2007), and attention is necessary.

Therefore, Table 6 shows the average value of the responses to the questionnaire for each prefecture with respect to the WTP for *Hijiki* from Ise-Shima and the explanatory variables that were significant in the regression analysis of the previous section. The result of the regression analysis in the previous section indicates that “consumers who are closer to Ise-Shima have lower willingness to pay for marine products of Ise-Shima.” However, in fact, Mie Prefecture, which is the closest to Ise-Shima, has the highest WTP and Osaka has the lowest WTP. Although the rankings of Aichi and Kyoto are reversed, the tendency is that consumers who are closer to Ise-Shima are more likely to have a higher WTP for the Ise-Shima products.

This is because the relationship is not simple as “the WTP decreases as the distance becomes physically longer”. Rather, “the value” or “special feeling,” which comes from the long distance, is implied. It suggests that other influences are controlled and attention is paid only to the effect of distance, “WTP can increase as the distance lengthens.” On top of that, other factors shown in table 6 such as the awareness of

Consumers' Evaluation of "Ise-Shima" and "Ama" through a Focus on Distance from Consumption Area

Table 6 Average by prefecture

	Aichi	Mie	Kyoto	Nara	Osaka
WTP	125.6	129.1	126.7	127.4	124.3
Age	45.0	45.7	44.8	45.8	45.1
Household income	3.47	3.27	2.99	3.20	3.16
<i>Hijiki</i> experience	0.01	0.00	0.00	0.01	0.01
<i>Hijiki</i> preference	2.88	2.99	2.97	2.06	2.89
Ads awareness	2.52	3.33	2.43	2.96	2.18
Shopping frequency	1.54	1.54	1.53	1.53	1.50
Japanese food frequency	1.78	1.87	1.81	1.89	1.79
Distance	92.3	39.8	109.2	86.5	111.6

Note: Willingness to pay was answered in yen, age in years, distance in km and others shown in Table 4.

advertisements on the localities affect on WTP. As a result, there is a relationship that "the WTP becomes higher if the distance shortens"<sup>(9)</sup>.

#### 4-2. Conclusion and further research

Using choice experiments, this study clarified how high a WTP consumers have for Ise-Shima products and *Ama* hand-picked products relative to ordinary marine products. In addition, the regression analysis revealed the consumer traits associated with a high WTP for Ise-Shima products.

From the results of the choice experiments, the WTP for 15 g of Ise-Shima dried *Hijiki* is 44.4 yen higher than the domestic one, and *Ama* hand-picked products have a 38.3 yen higher WTP than that for ordinary products. In addition, the results of the regression analysis found that the WTP for Ise-Shima products (*Hijiki*) is related to factors such as age, household income, preference, advertisement awareness, shopping frequency, Japanese food frequency, and distance to Ise-Shima.

Regarding distance, our study suggests that although a short distance has a negative influence on WTP, it has a positive influence on other factors such as advertisement awareness that increase the WTP. Consequently, people living nearby have a high WTP.

Finally, further study is needed because this study surveyed only five prefectures around Ise-Shima (Aichi, Mie, Kyoto, Nara, and Osaka). Expanding the target to the entire country can help to more generally clarify the areas in which it is highly evaluated and the reasons for such an evaluation. In particular, regarding the

influence of distance, the relationship conceivably changes over a certain distance, possibly requiring further analysis. In addition, because this survey was conducted before the decision was made to hold the Ise-Shima Summit, the influence of the Summit could be analyzed by carrying out the survey again.

#### Notes

- (1) As subsequently described, the marginal willingness to pay is measured by Matsui *et al.* (2015) through choice experiments conducted with students. However, our present study conducts these experiments using general consumers.
- (2) We thought that additional analyses for each prefecture would be conducted. Therefore, we considered that the same number of samples in each prefecture should be used rather than allocating samples by the population ratio of each prefecture. Even in the subsequent estimation, priority is given to securing the total number of samples, and samples are not extracted based on the population ratio.
- (3) For details on the methods and others of choice experiments, please refer to Matsui (2015).
- (4) Matsui *et al.* (2015) distributed the questionnaires twice; however, the second distribution was after the decision was made to hold the Ise-Shima Summit. Thus, considering its impact, this research refers only to the first result, which was achieved before the decision was made to hold the Ise-Shima Summit. The second result was 11.79 yen and 11.39 yen, respectively, indicating a small difference from the first distribution in the meaning that the WTP in both studies was much lower than the result obtained in this study.
- (5) We focus on geographical factors, such as place of residence in relation to the point of view of production and the locality marketing, which is subsequently described. Therefore, an analysis is carried out on Ise-Shima products, which are regarded as largely influenced by these factors.
- (6) The minimum was set to “100 yen or less,” the maximum was set to “160 yen or more,” and the interval was set from 102 yen to 158 yen in two-yen increments.
- (7) The explained variables were the value answered by the above CVM form, and the answer of “100 yen or less” or “160 yen or more” existed. Thus, a Tobit model was used.
- (8) Estimations without the explanatory variables (18)-(21) have almost the same result. Therefore, we considered that no influence of multicollinearity exists between residence and distance.
- (9) However, further analysis may be necessary for this because distance affects the

Consumers' Evaluation of "Ise-Shima" and "Ama" through a Focus on Distance from Consumption Area

awareness of advertisements.

References

- [1] Oura Y. (2007) *Consumer Behavior and marketing Strategies on Fresh Fruits and Vegetables*, Norin Tokei Kyokai. (In Japanese)
- [2] Matsui T. (2015) "Large-scale Aquaculture and Local Community—an Example of Kamisaki-ura in Minamiise-cho—," *Journal of regional fisheries*, 55(2,3), 19-35. (In Japanese with English abstract)
- [3] Matsui T., Hirose M., Tanaka H., Ando K. and Yamada F. (2015) "Possibility of utilizing the various regional resources: Paying attention to the seaweed of Ise-Shima district," *kokusai gyogyo kenkyu*, 14, 1-10. (In Japanese with English abstract)

[Supplementary Information] The contents of this paper result from the research by the Chubu Electric Power contracting project, "Study of Agriculture, Forestry and Fisheries Promotion Measures in Mie Prefecture."