

Marketing study for  
regional brand products  
--A study for Kagoshima  
Berkshire pork--

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# 1. Background, problems, and purpose

# Background

The expansion of agricultural products import, the necessity to activate rural areas where population is declining, and enforcing systems such as regional collective trademarks and the protecting system for geographical indications

→ In Japan, efforts for branding agricultural products continue.

(as of March 31st in 2017, 605 regional brand products are registered to Regional Collective Trademark System)

- Problems in regional collective trademarks

- The construction of a system in which production standards are set and one can confirm whether those standards are satisfied is not a requirement (Naito 2015).

- There is a risk that it becomes hard to supply regional brand products with constant quality, and the assurance function, which is one of the functions of brand products, can be impeded.

# Background and problems

- In fact, it is pointed out that Japanese agricultural products are insufficient in terms of the quality assurance, the differentiation, and the discriminability, because the construction of production control systems is not progressing, and the fulfillment of fundamental product functions is delayed (Saito 2011)  
→ It is desired to construct production control systems for regional brand products.

## 【Problem① (Section 2)】

- Focusing on a case of Kagoshima Berkshire pork, which is a representative pork brand in Japan, we examine consumer evaluations of the establishment of production control systems, by means of a choice experiment by a Web questionnaire.
- Also, we examine what kind of consumers highly evaluate these quality control systems.

# Background and problems

- Requirements for successful regional brand products are not only to build a quality control system.
- It is also important to improve the awareness of the products, and to form a strong, favorable, and unique brand image.
- To understand how those factors influence consumption behaviors and to verify the requirements for success, we need to confirm purchase decision-making processes of consumers.

## 【Problem② (Section 3)】

- We analyze the purchase decision-making process composed of information route → knowledge → evaluation → purchase behavior, for Kagoshima Kurobuta, which is a brand of Kagoshima Berkshire pork.

## 【Purpose】

- Through examining the above problems, we aim to provide implications for establishing branding strategies for regional brand products.

2. Consumer evaluations of the establishment of quality control systems for regional brand products

# Overview of the subject products

- Kagoshima Berkshire pork
    - Representative pork brand in Japan
      - In brand grading by meat buyers surveyed by Nikkei Research, it gained the first rank with a high score 408. The score of the second rank was 334.
      - In the production area, while there are organizations that set production standards and check whether the standards are satisfied, there are independent producers who do not join such organizations.
- We will verify the effect of maintaining production control systems by means of a choice experiment.



# Existing studies

- Studies about brand control

There are literatures in which the effect of certification systems is verified, such as Skuras and Vakrou (2002), Kato (2010), and Onozaka and Dawn (2011).

- However, as far as I know, there is no literature in which the influence itself of the establishment of production control systems is directly verified.

# Designing a choice experiment ①

Table 1. Attributes and grades of pork

Attribute	Grade
Production area and breed (the presenting order is fixed)	U.S. pork, domestic pork, Kagoshima Berkshire pork
Production control system (Except for Kagoshima Berkshire pork, no standards)	No standards, standards without third-party check, standards with third-party check
Price (U.S. pork)	98 yen, 124 yen, 150 yen, 176 yen, 202 yen, 228 yen
Price (domestic pork)	128 yen, 162 yen, 196 yen, 230 yen, 264 yen, 298 yen
Price (Kagoshima Berkshire pork)	268 yen, 306 yen, 344 yen, 382 yen, 420 yen, 458 yen

1) For the choice set, we generated 36 items each of which is composed of four choices including "I will not buy", using %MktEx macro of SAS based on D-Optimal criteria in a system at Agriculture, Forestry, and Fisheries Research Information Technology Center. However, since 36 items are too many, we divide them into four blocks each of which has 9 items, based on mark patterns.

- To deal with realistic purchase situations, we included U.S. pork and domestic pork.

- All the U.S. pork and domestic pork that are not special brands have “no standards”.

- Since attributes and grades vary depending on production areas and breeds of pork, we used a label-type choice set.

When you came to a shop to buy pork loin (for shabu shabu), which one would you choose

if the following kinds of pork are on sale?

Please choose one you would like to buy the most.

	(1)	(2)	(3)	(4)
Production area and breed	U.S. pork	Domestic pork	Kagoshima Berkshire pork	I will not buy.
Production control system	No standards	No standards	Standards without third party check	
Price per 100 g	98 yen	230 yen	458 yen	

Figure 1. Choice set example

# Designing a choice experiment ②

- **Details of the production standards** for Kagoshima Berkshire pork

“To manifest the sweetness of meat, pigs are raised by feeding food that contains sweet potatoes in the amount of 10 to 20 percent, for more than 60 days before shipping the pigs.”

“To provide pork with a constant quality level, only pork that passed certain criteria, such as the carcass weight and the fat thickness, will be shipped to market.”

- **Details of the third-party check** for the compliance condition for the standards of Kagoshima Berkshire pork.

“A third-party other than the producer itself (such as an organization to which the producer belongs) will check whether the above production standards are satisfied.”

# Survey subjects of the choice experiment

Table 2. Overview of analysis subjects

	Total (number of people)	Age (%)			Occupation (%)				
		Less than 40	40s and 50s	60 and over	Full time	Part time	Student	House wife/husband	No occupation
Men	267	29.6	40.8	29.6	74.2	6.7	2.6	1.5	15.0
Women	480	18.3	34.8	46.9	27.1	16.7	0.6	46.7	9.0
	Household (%)		Mean number of household members	Food expenses per person (%)					
	Single	Household with two people or more		Less than 20,000 yen	20,000- 40,000 yen	40,000- 60,000 yen	more than 60,000 yen		
Men	26.6	73.4	2.52	39.7	41.6	12.0	6.7		
Women	12.9	87.1	2.54	44.6	44.6	8.8	2.1		

- The data of a Web questionnaire conducted in January 2017
- We conducted a preliminary survey nationwide for 20,000 people aged 18 years old and over, based on distributions by prefecture, gender, and age group. Among those people, we randomly extracted 800 people who had ever purchased fresh Kagoshima Berkshire pork in the past one year.
- We used the data of total **747 people**, removing outliers.

# Estimation method for the choice experiment ①

- The deterministic utility obtained when choosing pork  $V_i$  was formulated as follows:

$$V_{i \in \{1,2,3\}} = \beta_{asc}Pork_i + \beta_{m1}Man1 + \beta_{m2}Man2 + \beta_pPork_iPrice$$
$$V_4 = 0$$

*Pork<sub>i</sub>*; Production area and breed,

*Man1*; Dummy of “with production standards, without third-party check”

*Man2*; Dummy of “with production standards, with third-party check”

*Price*; Price

As the estimation method, we chose the conditional logit model.

# Estimation method for the choice experiment ②

- We estimated the 95% confidence intervals of the WTP mean for Kagoshima Berkshire pork and the MWTP mean for each production control system by means of the method by Krinsky and Robb (1986).
- For **the difference of MWTPs between groups** of the production control systems, we conducted the one-sided test by means of the method proposed by Poe et al. (2005) and Aizaki (2015), under the alternative hypothesis that MWTP for “with third-party check” is larger than MWTP for “without third-party check”.

# Estimation method for the choice experiment ③

- To test determinants factors of individual heterogeneity, we estimated **the interaction effects model** where variables such as individual properties, the dietary orientation, and retailers of Kagoshima Berkshire pork were multiplied by the variables other than *Pork<sub>i</sub>Price*.
- For the dietary orientation, we conducted the factor analysis for the result of replies to multiple questions about daily dietary life, and we used the factor scores of two extracted factors, “the safety orientation” and “the high-quality product orientation”.

We used SPSS Statistics 22 for the factor analysis, and we used R 3.3.2 for other analyses.

# Result of factor analysis

Table 3. Result of factor analysis about dietary-orientation

	I	II
I pay attention to news about food safety.	<b>0.816</b>	-0.063
When buying food, I choose domestic products.	<b>0.796</b>	-0.063
When buying processed foods and so on, I check the ingredients.	<b>0.765</b>	-0.068
I do not like imported foods very much.	<b>0.590</b>	-0.131
When buying food, I take into account certification labels such as a JAS mark.	<b>0.461</b>	0.131
I spend money on delicious foods.	0.048	<b>0.716</b>
I would like to spend money on food to some extent.	0.257	<b>0.649</b>
I cut down on food expenses as much as possible.	0.210	<b>-0.527</b>
I buy discount foods.	0.120	<b>-0.340</b>

1) For all the above, we obtained replies based on a six-point scale from "strongly agree" to "strongly disagree".

We performed the promax rotation in the maximum likelihood method. We removed "I choose food whose quality is high, even if it is expensive", which showed high factor loadings in multiple factors.

- We conducted the factor analysis by removing an item “I choose food whose quality is high, even if it is expensive”, which showed high factor loadings in multiple factors.
- We denoted the first factor as “**safety orientation**”, and the second factor as “**high-grade product orientation**”.



# Estimation result of the conditional logit model

Table 4. Estimation result of the conditional logit

	Main effects model		Interaction effects model							
	Main effects	Main effects	Interaction effects							
			Retailer of Kagoshima Berkshire pork		Dietary orientation		Individual property variables			
			Department store	Mail order	Safety orientation	High quality product orientation	Female dummy	ln(age)	Food expenses per person	
Alternative-Specific Constant (ASC)										
U.S. pork	1.21*** 7.06	8.86*** 10.77			-0.70*** -8.49	0.12 1.36	-0.50*** -3.67	-1.82*** -8.65	-0.19** -2.25	
Domestic pork	2.97*** 28.36	5.69*** 8.51			-0.28*** -4.50	0.31*** 4.68	-0.21* -1.95	-0.62*** -3.60	-0.03 -0.53	
Kagoshima Berkshire pork	3.56*** 22.79	4.37*** 4.92	0.28** 2.48	-0.20 -1.59	-0.04 -0.43	0.54*** 5.85	-0.14 -0.99	-0.22 -0.99	0.21*** 2.64	
Quality control system										
Standards without third-party check	0.41*** 6.26	-1.16 -1.27	0.09 0.58	0.39** 2.23	0.08 0.86	0.07 0.69	-0.02 -0.13	0.37 1.59	-0.01 -0.12	
Standards with third-party check	0.74*** 11.46	0.39 0.44	-0.21 -1.34	0.49*** 2.83	0.20** 2.12	0.13 1.30	0.21 1.43	0.07 0.30	-0.03 -0.39	
Price (yen/100g)										
U.S. pork	-0.008*** -7.24	-0.009*** -7.90								
Domestic pork	-0.006*** -12.96	-0.006*** -13.20								
Kagoshima Berkshire pork	-0.007*** -16.03	-0.007*** -17.02								
Number of respondents	747	747								
Number of observations	26892	26892								
Maximum logarithmic likelihood	-7268.88	-6778.41								

1) The upper rows show estimated parameters, and the lower rows show t-values. Also, \*\*\*, \*\*, and \* mean significance at the level of 1%, 5%, and 10%, respectively.

# Main effects model

Table 5 Confidence intervals of mean WTP (Main effects model)

	2.50%	50%	97.50%
Kagoshima Berkshire pork	515.8	543.6	576.8
Standards without third-party check	42.5	62.3	84.3
Standards with third-party check	90.7	112.4	136.8

- For the production control systems, both showed positive statistical significance.
- The mean MWTP for “with standards, without third-party check” is 62.3 yen, and for “with standards, with third-party check” is 112.4 yen.
- We conducted the one-sided test for the difference between the groups for both variables, and it was shown that “with third-party check” was significantly larger at the level of 1%.

# Interaction effects model ①

- The older the buyers were and when they were women, the lower evaluations they gave to U.S. pork and domestic pork.
  - The higher the food expenses per person were, the lower evaluations the consumers gave to U.S. pork, and the higher evaluations they gave to Kagoshima Berkshire pork.
  - The more attention one paid to safe foods, the lower evaluation he/she gave to U.S. pork and domestic pork, and the higher evaluation he/she gave to “with standards, with third-party check”.
- It has been shown that the establishment of a production control system is **appealing to safety-oriented consumers.**

# Interaction effects model ②

- The higher quality food one prefers, the higher evaluation he/she gives to domestic pork and Kagoshima Berkshire pork, which are considered to be of high quality.
- Focusing on retailers of Kagoshima Berkshire pork, we found that those who bought the pork through **mail order** gave higher evaluations to the production control system.  
→ It is possible that they gave higher evaluations to the establishment of the production control system, because mail-order is a way to buy the products without seeing them.
- Buyers in department stores gave high evaluations to Kagoshima Berkshire pork.

# Discussions

- We have verified consumer evaluations of the establishment of production control systems, focusing on a case of Kagoshima Berkshire pork.
- We have confirmed that WTP of consumers increases when production standards are set and a system for compliance with the standards is maintained.
- By the method proposed by Poe et al. (2005), we have performed a test for the difference of MWTPs between groups, and we have confirmed that the group with a third-party check received a higher evaluation with statistical significance.
- We have successfully shown the significance of building a production control system, and have provided information that can contribute to establish a branding strategy.
- Also, we have confirmed that people who were concerned about safety and who used mail order gave higher evaluations to the production control system.

### 3. Influence of knowledge and evaluations of regional brand products on repurchase

# Background

- In the previous section, we have verified the usefulness of the establishment of product control systems, by means of a choice experiment.
- However, requirements for successful regional brand products are not only to build a production control system.
- It is also important to improve the awareness of the products and to form a brand image.
- It is required to analyze purchase decision-making processes, and elucidate how these factors affect consuming behaviors.
- In this section, focusing on Kagoshima Kurobuta, which is the most representative brand of Kagoshima Berkshire pork, we will analyze **the purchase decision-making process**.

# Analytical perspective

- Consumers' attitudes (evaluations) can be divided into “the recognition”, which is based on objective characteristics, and “the emotion”, which is based on subjective experiences.
- In past studies about meat consumption behaviors, “the functionality” such as the quality and the specifications, which are mainly evaluations as the recognition, has been regarded as important.
- On the other hand, Sugitani (2013) points out that “attachment” and “admiration”, which are emotional evaluations, are important for branding products.
- In this section, we will test whether knowledge about the production standards and so on can lead to purchase behaviors through both functional and emotional evaluations by consumers.



# Analysis subjects

- We will analyze repurchase decision-making processes of consumers who have ever bought the products once or more.
- This is because regional brands of meat are often products for regular customers, and in a survey for meat buyers by Japan Finance Corporation (2009), it was shown that an important selection criterion for purchasing is that there exist repeating demands.
- We conducted a screening survey through a website in March, 2015, for randomly extracted 40,000 men and women who were 20 years old and over. The purchase rate of Kagoshima Kurobuta in Kagoshima Prefecture was the highest, 89.5%. Also, it was 36.7% in Tokyo, and it was the highest in the areas other than Kyushu area. Therefore, we denote Kagoshima Prefecture as “the production area”, and Tokyo as “the consumption area”, and we decided to compare the purchase decision making processes in both areas.

# Overview of the main survey

Table 6. Overview of analysis subjects

	Kagoshima Kurobuta	
	Kagoshima	Tokyo
n	150	150
Mean age	45	45
Gender: male (%)	48	61 *
Mean annual income (10,000 yen/household)	436	595 **
Having pre-schoolers in a household (%)	19	5 **
Mean duration of residence (years)	4	4
No particular territorial connection with the	16	82 **
Orientations for foods		
Domestic	73	73
Regional brand	45	41
Production area support and fair trade	30	14 **
Trends and topics	13	17
Direct sales stores and sales corners of regional products	40	25 **

- In the main survey, we extracted 150 people in Tokyo, and 150 people in Kagoshima Prefecture, from men and women who had purchase experiences for the products and who were 20 years old and over, without a bias in age.
- The table in the left shows an overview of analysis subjects.

# Analysis model

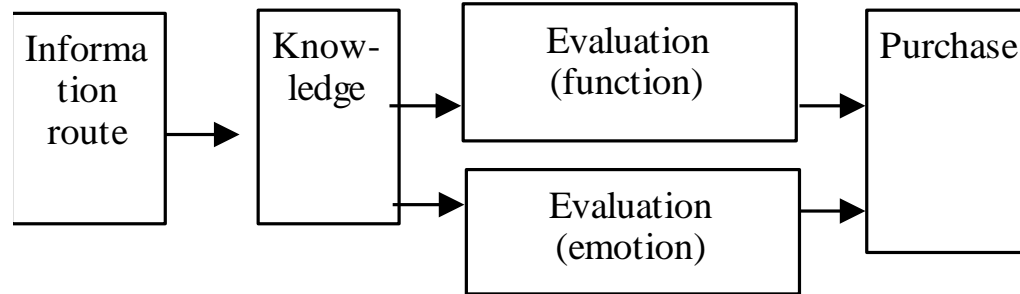


Figure 2. Model of consumers' purchase decision-making process

Reference: the author made the diagram based on Blackwell et al.,(2006)

- There is no completed model about purchase behaviors of consumers, and it is desired that we properly use a conception model based on hypotheses in research (Sugimoto 2012).
- In this report, based on the models by Blackwell et al.,(2006) and Howard and Sheth (1969), we assumed a purchase decision-making process: Search → Knowledge → Evaluation → Purchase.
- For Evaluation in the above process, we divide it into the functionality evaluation and the emotional evaluation.

# Method of analysis

- To verify whether there exists a causal relationship that knowledge forms evaluation, and then that leads to repurchase of the product, we conducted structural equation modeling.
- To compare the purchase decision-making processes in the production area and the consumption area, we conducted the multiple group analysis in both areas.
- For the estimation, we used the maximum likelihood method, and we analyzed the data using R3.3.3.

# Variables used in the analysis

Table 7. Variables used in the analysis

				Kagoshima	Tokyo
Number of samples (persons)				150	150
Information 1)	TVs	s1	TV, radio, and so on	44.7	27.3 **
	Word of mouth communication	s2	Word of mouth communication from friends and acquaintances	13.3	12.0
	Certifications	s3	Certification mark, and so on	33.3	14.0 **
Knowledge 2)	Breed	k1	Kurobuta pork of the pure Berkshire breed	53.3	21.3 **
	Feed	k2	Giving feed in which sweet potatoes are added before shipment	51.3	23.3 **
	Production method	k3	Produced by members of Kagoshima Kurobuta Producer Conference	46.0	14.0 **
	Meat characteristic	k4	Fine meat fibers, many umami components	60.0	26.7 **
	Certification	k5	Certified by trademark registration	52.7	19.3 **
Function 3)	Taste	f1	Tasty and delicious	92.7	87.3
	Safety	f2	High level of safety	80.0	69.3 *
Emotion 3)	Attachment	e1	Being used to eat (q1)	68.0	26.0 **
			Having a strong feeling and an attachment (q2)	66.7	32.7 **
	High-grade feeling	e2	There are high-grade and special feelings (q3)	74.7	73.3
			There is an appeal that cannot be found in other products (q4)	67.3	52.7 **
Repurchase interest *3	p	I would like to buy and consume the products again.	78.7	69.3	

1) The rate of replying yes to a question about a source from which one has ever obtained information about Kagoshima Kurobuta.

2) The rate of replying "I know it very well" or "I know it fairly well" to each question with a five-point scale from "I know it very well" to "I do not know it at all".

3) The rate of replying "agree" and "somewhat agree" in a five-point scale.

4) \*\* and \* mean that there is a significant difference at the 1% level and 5% level, respectively.

- For knowledge, attachment, and a high-grade feeling, we analyzed them as latent variables extracted from multiple observed variables.
- The Cronbach alpha coefficient is 0.928 for knowledge, 0.821 for attachment, and 0.848 for high-grade feeling, and we obtained favorable results.
- We assumed double-headed arrows between all the observed variables for knowledge.

# Diagram of a hypothetical model

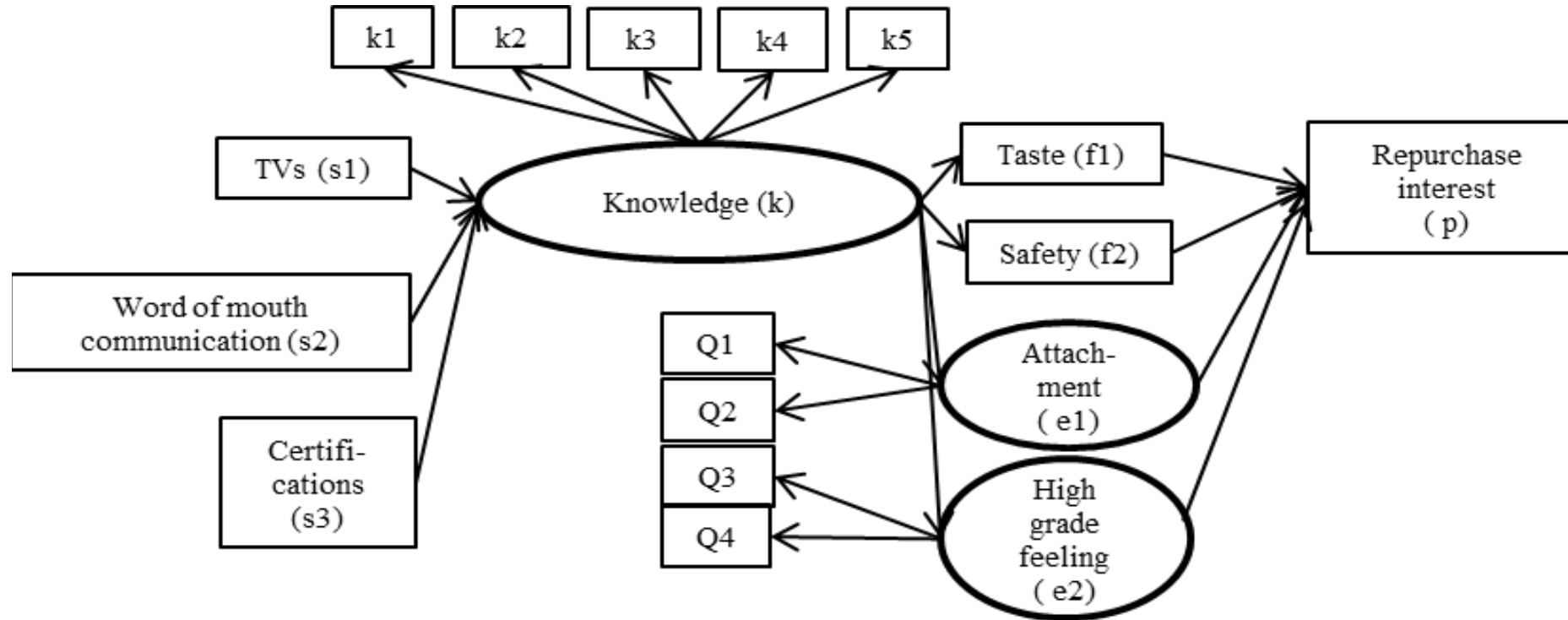


Figure 3. Hypothetical model diagram

\*Error terms and double-headed arrows are omitted here.

# Equality constraints in the multiple group analysis

Table 8. Comparison of the fit index of each model

	GFI	AGFI	CFI	AIC	RMSEA
Model 0	<u>0.986</u>	0.975	<u>0.968</u>	9145.9	0.051
Model 1	<u>0.986</u>	<u>0.976</u>	<u>0.968</u>	<u>9139.0</u>	<u>0.050</u>
Model 2	0.984	0.974	0.958	9149.6	0.056
Model 3	0.983	0.973	0.947	9163.4	0.061

Table 9. Test of the equality constraints in each model

	$\chi^2$ value (df)	p-value	Test of equality constraints (df)	p-value
Model 0	T0=262.09(188)	0.000		
Model 1	T1=267.27(194)	0.000	T1-T0=4.98(6)	0.521
Model 2	T2=303.88(207)	0.000	T2-T1=36.61(13)	0.000
Model 3	T3=341.61(219)	0.000	T3-T2=37.73(12)	0.000

- Model 0 (equivalence of forms)
- Model 1 (equivalence of loadings added constraint of model 0)
- Model 2 (equivalence of variances and co-variances added constraints of model 1)
- Model 3 (equivalence of error variances added constraints of model 2)
- We compared the above four models.
- From the results of the fit indices and the likelihood ratio test, we conducted an estimation using model 1.

Table 10. Estimation result of covariance structure analysis

		Kagoshima	Tokyo
		Standardizing coefficient	Standardizing coefficient
TVs		-0.016	0.127
Word of mouth communication	→ Knowledge	0.205 *	0.093
Certifications		0.161 +	0.125
Knowledge	→ Taste	0.628 **	0.765 **
	→ Safety, etc.	0.749 **	0.790 **
	→ High-grade feeling	0.741 **	0.911 **
	→ Attachment	0.817 **	0.694 **
Taste		0.163 *	0.147 +
Safety, etc.	→ Repurchase	0.279 **	0.178 *
High-grade feeling		-0.144 +	0.373 **
Attachment		0.609 **	0.208 *
Knowledge	→ Feed	0.537 -	0.459 -
	→ Meat characteristic	0.673 **	0.593 **
	→ Breed	0.447 **	0.408 **
	→ Production method	0.504 **	0.454 **
	→ Trademark	0.516 **	0.465 **
High-grade feeling	→ There are high-grade and special	0.810 -	0.830 -
	→ There is an appeal that cannot be	0.933 **	0.886 **
Attachment	→ Being used to eat	0.759 -	0.732 -
	→ Having a strong feeling and an	0.856 **	0.874 **
Feed	⇔ Meat characteristic	0.573 **	0.630 **
Feed	⇔ Production method	0.509 **	0.640 **
Feed	⇔ Trademark	0.414 **	0.585 **
Feed	⇔ Breed	0.622 **	0.544 **
Meat characteristic	⇔ Production method	0.592 **	0.564 **
Meat characteristic	⇔ Trademark	0.482 **	0.641 **
Meat characteristic	⇔ Breed	0.480 **	0.657 **
Production method	⇔ Trademark	0.609 **	0.688 **
Production method	⇔ Breed	0.539 **	0.653 **
Trademark	⇔ Breed	0.483 **	0.649 **

# Estimation result

- Information route→Knowledge

The word-of-mouth communication and certifications showed positive significance in Kagoshima Prefecture.

- Knowledge→Evaluation

In both Kagoshima and Tokyo, there is positive significance in all the evaluations .

- Evaluation→Repurchase

There is positive significance except for the high-grade feeling in Kagoshima Prefecture.

For the high-grade feeling in Kagoshima Prefecture, it may be possible that consumers avoided the products because the prices were high.



# Discussions

- The followings were indicated from the estimation result.

## 【Information sources→Knowledge】

- In Kagoshima Prefecture, the word-of-mouth communication and certifications contributed to the knowledge formation.
- In the production area, it is possible that information sources that are common in daily life became significant.

## 【Knowledge→Evaluation】

- Knowledge contributes to form not only the functional evaluation but also the emotional evaluation.

## 【Evaluation→Repurchase】

- Not only the functional evaluation, but also the emotional evaluation can lead to repurchase of the products.
- The degree of attachment showed the strongest influence in Kagoshima Prefecture, while a high-grade feeling showed the strongest influence in Tokyo. The influence of evaluation varied between the production area and the consumption area.

# 4. Conclusion

# Conclusion

## 【Section 2】

- We have confirmed that the establishment of production control systems increases consumers' WTP.
- The establishment of such production control systems was highly evaluated by consumers who were concerned about safety and who used mail order.

## 【Section 3】

- In the purchase decision-making process for Kagoshima Kurobuta, knowledge forms functional and emotional evaluations, which lead to purchase behaviors.
- An influence of the evaluations on repurchase of the products varied between the production area and the consumption area.
- We have shown the importance of building a production control system, and have elucidated the purchase decision-making process for effective promotions. We have successfully provided useful information to build a brand strategy for regional branding.

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Thank you very much for your attention!