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Using Market Segmentation to Assess Consumers' Acceptance of Organic Eggs in Taiwan

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Abstract

The needs of the organic eggs are increasing; therefore, the farmers of chicken-egg (FCE) provide the best eggs to their consumers to satisfy their needs and wants. Because the FCE cannot satisfy every consumer's needs, FCE has to focus on some specific groups to satisfy their needs and wants.

This paper is to clarify the segmentation of the customers in middle Taiwan and build the empirical model via Cluster Analysis. The 460 samples are taken randomly without some adjustment, but only 341 samples are used. As the results, this paper gets the segmentations of product oriented, economic oriented, and production oriented, and which would be the target markets that the FCE should focus on.

Keywords: *Organic eggs, Cluster analysis, Market segmentation, Product Position*

Introduction

Customers have gotten benefits from the high-tech products and had better lives, be educated and are strong self-esteem, and they know health is important and have tried to do many things to get healthy bodies. Besides doing exercise often to have good body shapes, they would eat healthy food and seek the organic foods that do not contain any chemical. Since organic foods have been popular in recent years, female consumers, higher education consumers have better attitudes towards organic foods and restaurants than males' and lower education; married consumers, housewives, and high-income consumers have paid more attention on organic foods and restaurants (Lee, 2001).

The organic egg has been produced for many years, and is popular in Taiwan and in the foreign countries. The farmers of chicken-egg (FCE) have found that people in Taiwan seek for higher quality of the healthy foods than before, but the consumers who would purchase the organic eggs more are not very obvious. This paper will focus on the consumers to know if they have purchased the organic eggs in the recent six months and to know about their opinions on the organic eggs.

Marketing segmentation is the overall process of identifying a group of customers based on their characteristics and behaviors in similar one or more ways that differ from the entire mass market (Winer, 2004). Competition will exist for identified market segments in "niche" positions, and it is the process of identification of differential advantages in each segment. Proper segmentations would improve marketing, distributions, manufacturing efficiency, profits, and market share (Blackwell, 2001).

Researchers in Taiwan have done the research on the organic foods that focused on the healthy reports are significantly correlated with the organic foods and increase the demands on organic restaurants; the environment protection and the pollution control should be concerned seriously under the pressure of the trade liberalization and the entrance into WTO, the demands on agricultural products would decrease. However, the researches of the organic egg in market segmentation and target market are not mentioned, so this paper would focus on the strategies of market segmentation on the organic eggs. The purposes of this paper are to understand and analyze the features of the organic eggs; based on knowing the access consumers' acceptance of the organic eggs, this paper would divide the customers for numerous small groups, and then to know who accept and purchase the organic eggs.

The data used by this paper are from the field survey based the consumers went to buy some eggs in middle Taiwan. The 460 samples are taken randomly without some adjustment, but only 341 samples are used. The questionnaire data would be analyzed via Cluster Analysis.

Conceptual Framework

Taiwan is around the ocean, and natural resources in it are not plenty. So it should depend on the international trade to get large of resources. Since the resources in Taiwan are limited, the environment of Taiwan should be protected, and the government has worked on this issue for many years. In addition, for reducing the impact from the WTO, the quantity of agricultural production should reduce; therefore, organic agriculture will be developed. Some of the farmers have planted their plants without using any chemical fertilizers and pesticides. Therefore, the agricultural trade liberalized would improve the implement of the organic agricultural (Chen, 1999). Since people have noticed the health is more important than everything, price is not the only factor to influence consumers' purchasing intention. The three elements of the involvement, the value, and the knowledge of products influence consumers' purchasing intention (Chen, 2004).

The organic eggs should follow the Chinese Organic Agribusiness Standard (COAS) system, and the thirty days before the organic grain fed hens past the examination, the hens should be fed by a hundred percent of the finest organic grown grains that has COAS certificate every day. During the transforming time, eighty percent of the finest organic grown grains that feed on the organic grain fed hens every day should pass the COAS examination (Chinese Organic Agribusiness Standard, 2005). The organic grain fed hens should live on the free-range farms where contain the shelves to shield from sun, wind, and water, air is fresh, and the environment should be free from the pollutants. In this area, the 20 organic grain fed hens stay under the area of 6 feet square; therefore, the organic grain fed hens are about to eat, exercise, and socialize in their health's contents. The drinking water should be clear and fresh, the ph is between 6.8~7.5, no more than 30mg/ml on nitrate, no more than 40mg/ml on nitrite, and water degree of hardness is between 100 ~120 mg/l. The FCE should use artificial light to increase sun exposure time, but no more than 16 hours. Eggs will be gathered daily, washed, and hand packed.

Marketing segmentation is the process of grouping a market into smaller subgroups. The marketers should not be thinking of their customers as part of massively the homogenous groups (Levitt, 1974). Each of the subgroup has its own different needs and wants, and

marketers should response the different products and marketing mixes to satisfy their customers' needs (Kolter, 1994).

Segmentation is the basis for developing target and effective marketing plans. A segment-orientated marketing approach would offer advantages for both customers and businesses. The variables are used for segmentation in geographic, demographic, psychographic, and behavioural bases. The demographic segmentation is to cluster the customers into groups depending upon common interests and attitudes. The examples include age, gender, income, occupation, education, religion, nationality, and ethnical groups (Recklies, 2001).

Background on the organic eggs in Taiwan

There are many ranches to feed different poultry in Taiwan, and some of the FCE have fed the organic grain fed hens and produced the organic eggs. One of the most famous ranches is Shih-An Farm (SAF) where feeds the hens about 3.30 millions in the location area 37.487 m², and the floor space 14,700.94 m² per year. The SAF established in 1976. In 1994, SAF comprehensively rebuilt the environmental house for hens. In 1996, SAF was the first one to purchase the MOBA 330 washing eggs equipment, which is the first equipment that was purchased and used in Asia. On May 1, 1998, SAF passed the authenticated 1101st through the CAS fine egg product. On July 1, 1999, SAF passed the Chinese organic association COAA authenticates 88050101st. In 2002, it passed the authentication of BE02/3047HA through the HACCP international food safety control system. On September 1, 2005, the company started to implement the traceability system 500001st.

The goal of the SAF is to provide the best quality products to the consumers; therefore, it provided the "Fresh Egg" on August 22, 1999. The company has fed the hens and provided the eggs in none polluted areas, and introduced the equipments to control and feed the hens automotive without antibiotic, the growth hormone, the animal protein feedstuff, and getting any shots. On the other hand, the hens are fed by the high quality corn, the hydrolysis soybean protein, the yeast selenium, the pineapple enzyme, and some natural elements. In every two months, the hens would be draw blood to take the test to make sure they are healthy. The objective of SAF is the vision of managing philosophy, and getting informs organic generation.

Long-Chang Farm (LCF), which the brand name of Sunny Eggs was registered as the trademark in 2001, is another farm that feed healthy hens and provide high quality eggs to the consumers. LCF established in 1969 and introduced different species of the chicken from the United States, and later on it introduced the medicine and technology from the Europe and the United States to avoid losing any hens from the disease.

In 2000, LCF introduced the Salmel environmental airtight and temperature control the hen and egg house from German to cut off the disease and Fancom water control system and negative pressure pumping air system from Dutch to decrease the pressing between the hens. LCF feeds 85 thousand hens in the building that is with 100-meter long, 15-meter width, and seven stratums. LCF does not put any antibiotic into the feedstuff, so there is no any medicine residual risk in the eggs. LCF also builds the wash egg factory with 50-meter long and 15-meter width by the CAS national standard level. In addition, LCF planted grass, trees, and flowers between the Hen house and the egg factory, so the view of farm would be prettier. The main point is to protect the environment around the farm.

LCF provides every hen in the most comfortable environment with playing the classical music. The healthy and non-pollution eggs would be packed in the automated and information equipment flow, which is not only save 50% of labor force, but also reduces the hens' mortality rate in 30%. In order to satisfy the consumers, the company has developed high quality products by selecting β -Carotene, fish oil, and garlic powder to put into the feedstuff. Therefore, the eggs would contain plenty β -Carotene, DHA, and vitamin A, D, and E, and the nutrition of eggs would be higher than the normal eggs.

Empirical Method

From the interviewing data, 132 men and 308 women were interviewed; 246 of them are married. The family structure of 166 interviewees is 3-4 people, and the family structure of 118 interviewees is 4-5 people. 145 interviewees are 31-40 years old, 115 of them are 20-30 years old, and 2 of them are 60-70 years old. The income of 149 interviewees is 40-50 thousands, and then is 20-40 thousands for 16 people. 279 of interviewees have college degrees, and 182 interviewees work as the government servants, and only one interviewee is a farmer.

In addition, there are 177 customers, 36 men and 141 women, in whom 127 are married, have purchased the organic eggs. The family structure of the purchasing organic eggs customers in 79 interviewees is 3-4 people, which is the most, and then 48 people is 4-5 people. 61 customers who are in age 30s, 51 in age 40s, and 21 in age 50s have purchased organic eggs. 71 customers' income is between NT\$40,000 to NT\$60,000, 50 customers are between NT\$20,000 to 40,000, and only 10 customers are over NT\$80,000. Most of the customers, 76, are working for the government, and 49 of them are working in services. However, there is only one farmer have purchased the organic eggs.

This paper would use SPSS statistic computer package system to calculate the surveyed data. As the results, KMO (Kaiser-Meyer-Olkin) is 0.912, Table 1, if the KMO value is increasing, then the common factors would be more, which would be better to use Factor Analysis. $KMO > 0.8$ is good. Bartlett's test is used to see if the coefficient of correlation is fitted. χ^2 value is 3595.223, and the P value is 0.000. From the values, the covariable is existed (Schwab, 2005).

Table 1. KMO and Bartlett's Test

KMO (Kaiser-Meyer-Olkin) (MSA)	0.912	
Bartlett	Approximately χ^2	3595.223
	d.f.	190
	P Value	0.000

The factor analysis is based on the eigenvalue. The factor is established only if the eigenvalue is greater than 1, the explanation of the factor would be stronger. Choosing the right factor is by using the Screen test by Cattell, shown in Figure 1.

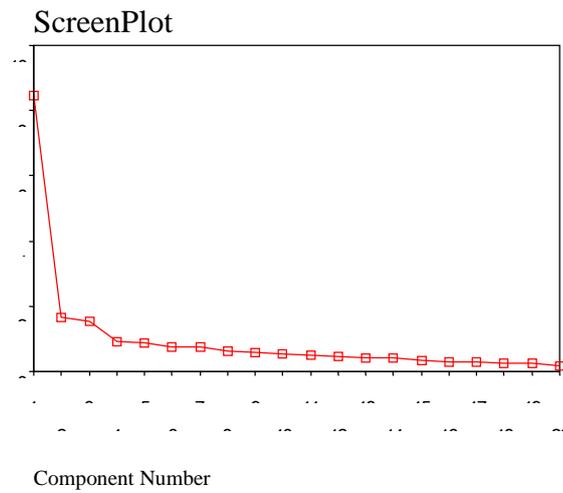


Figure 1. Screen Test

The Principle Component Method is the analytic tool used by this paper. In addition, Orthogonal Rotation is used by Varimax to calculate factors weights to get the eigenvalue greater than 1. Thus, the results of covariation and the results of factor weights divided into 3 factors, Table 2. Each factor would be named as following:

Table 2. The Results of Covariation from 341 Samples

Numbers and items	Calculate Factor Weights		
	Factor 1	Factor 2	Factor 3
3.Brands	.763	.180	.110
4.Authentications	.735	.169	.216
6.Promotion	.726	.171	.145
1.Ingredient	.717	.110	.279
2.Price	.708	.201	.04779
11.The organic eggs are easy to get	.694	.122	.208
10.The safety of eating organic eggs	.661	.121	.277
5.Distinctive	.636	.332	.255
12.The effectiveness of the organic eggs	.592	.343	.235
7.The suggestions from the specialists	.576	.340	.336
17.High nutrition	.471	.347	.363
13.Whights of the organic eggs is the main factor to choose as the prices are the same	.0887	.811	.321
14.Sizes of the organic eggs is the main factor to choose as the prices are the same	.07698	.773	.410
9. Using the health caring products would fit the consumers' identities	.373	.677	-.336
8.Purchaing organic eggs is the fashion tendency	.417	.580	-.158
15. Package	.416	.498	.329
19.FCEs want the government to set up the laws and regulations about the organic eggs	.214	.08766	.799
20.FCEs are willing to provide their organic eggs to take the examination to know if there is any medicine left and to improve the quality of the organic eggs	.246	.115	.791
18.The processes of feeding the hens, laying eggs, washing eggs, and deliver are control strictly	.489	.08818	.611
16.The benefits of eating the organic eggs	.151	.245	.270

1. Factor 1 It contains the brand, price, ingredient, authentications, nutrition, promotion, safety, effectiveness, the suggestions from the specialists, and if the organic eggs purchase easily. From this factor, the researchers could know what the customers expect for the products and the values of the products are fit for the customers. From the previous reasons, the factor 1 is named as "Product Oriented" (see Table 3).

2. Factor 2 It contains the weight and size of the organic eggs, package, fashion tendency that the customers notice and would be fit the customers' identities as they use the products. As this reason, the factor 2 is named as Economic Oriented (see Table 4)

3. Factor 3 It contains the ways of producing high quality organic eggs, the benefits of eating organic eggs, and the processes of producing the organic eggs. The FCE ask for the government to set up the laws and regulation for producing and selling the organic from these

reasons, the factor 3 is named as “Production Oriented” (see Table 5).

Table 3. Factor 1 Product Oriented

The items of the characteristics	Factor weights	Common factor	Eigenvalue	Explained covariance	α value
3.Brands	.763	.627			
4.Authentications	.735	.615			
6.Promotion	.726	.577			
1.Ingredient	.717	.604			
2.Price	.708	.544			
11.The organic eggs are easy to get	.694	.539	5.761	14.359	0.9142
10.The safety of eating organic eggs	.661	.529			
5.Distinctive	.636	.580			
12.The effectiveness of the organic eggs	.592	.524			
7.The suggestions from the specialists	.576	.561			
17.High nutrition	.471	.473			

Table 4. Factor 2 Economic Oriented

The items of the characteristics	Factor weights	Common factor	Eigenvalue	Explained covariance	α value
13.Whights of the organic eggs is the main factor to choose as the prices are the same	.811	.768			
14.Sizes of the organic eggs is the main factor to choose as the prices are the same	.773	.771			
9. Using the health caring products would fit the consumers' identities	.677	.710	3.021	15.103	0.7877
8.Purchaing organic eggs is the fashion tendency	.580	.536			
15. Package	.498	.529			

Table 5. Factor 3 Production Oriented

The items of the characteristics	Factor weights	Common factor	Eigenvalue	Explained covariance	α value
19.FCEs want the government to set up the laws and regulations about the organic eggs	.799	.691			
20.FCEs are willing to provide their organic eggs to take the examination to know if there is any medicine left and to improve the quality of the organic eggs	.791	.700	2.872	28.807	0.5921
18.The processes of feeding the hens, laying eggs, washing eggs, and deliver are control strictly	.611	.619			
16.The benefits of eating the organic eggs	.270	.155			

Empirical Results

This paper would use the Agglomerative Hierarchical Analysis to get the segmentation variables, and then use the Euclidean Distance to measure the similarity level. The researchers could use the coefficients of conglomeration to know the group numbers, Table 6. In the Table 6, group 5 becomes the group 4, the amount of variation of this coefficient is 18.88%, from the group 4 becomes the group 3, the variation of this is 33.17%, the group 3 becomes the group 2, the amount of variation of this coefficient is 27.95%, and the group 2 becomes the group 1, the amount of variation of this coefficient is 24.07%. From the data, the researchers have divided the groups into three would be the best.

This paper would use the K-Means Cluster to group the different samples. The second step is to input the group numbers and then do the K-Means of the non-hierarchical analysis to get different groups.

In the three groups, the group 3 has 148 people, which contains the most sample numbers, 43.4% in total percentage, the third group has 410 people, 41.06% in total, and the fewest sample numbers is the group 2, 53 people and 15.54% in total, Table 7.

The researchers use Kendall's Coefficient of concordance (W) to evaluate the similar between each group. Therefore, the researchers use W to test the three groups and products attributes. During 0.2 and 0.3 in the W, 1 presents the group tendency are the same, but 0 is not. If the samples are big enough, the researchers should test it by using χ^2 to see if the members of the groups have the same tendency. In the Table 8 $\alpha=0.01$, the researchers could know the each group has its own tendency.

Three factors and three groups are used in this paper to do the multivariate covariance analysis, and discuss the difference between the groups. The P values of each group are about 0.00, which is significant, Table 9.

To name the different segmentations, the researchers are not only used the highest average in factors but also could use Scheffe's post-comparison to compare the differences between the three factors.

Table 6. Cluster Number and Its Coefficient of Variation of This Coefficient

Numbers	Coefficients of Conglomeration	The Amount of Variation of This Coefficient
5	405.864	18.88%
4	482.509	33.17%
3	642.536	27.95%
2	822.148	24.07%
1	1020.000	-

Table 7. Results of the Market Segmentation by Sample Size

Groups	Group 1	Group 2	Group 3	Total
Sample size	148	53	140	341
Percentage	43.40	15.54	41.06	100.0

Table 8. The Consistent Testing for Each Group

Groups	Sample size	Coefficient of			P Value
		Consistence	χ^2 value	d.f.	
Group 1	148	0.269	1837.042	20	0.000*
Group 2	53	0.267	1818.49	20	0.000*
Group 3	140	0.277	1887.877	20	0.000*

*means p-value is equal to 5%, which is significant level.

Table 9. Individual Test and Scheffe's Post-Comparison

Average	Product Oriented	Economic Oriented	Production Oriented	Segment Named
Group 1	0.185	0.770	0.673	Economic Oriented
Group 2	1.409	-0.373	-1.038	Product Oriented
Group 3	-0.729	-0.469	-0.318	Production Oriented
F Value	201.186*	58.481*	115.783*	
Scheffe's Post-comparison	2>3 1>3 2>1 2>1>3	1>3 2>3 1>2 1>2>3	1>2 2>3 1>3 1>3>2	

Segmentation 1 —Economic Oriented

The segmentation 1 is focused on the economic oriented, which includes the brand, price, ingredient, distinctive, authentications, safety, effectiveness of organic eggs, nutrition, and the promotion of the organic eggs. As a result, the main customers in this segment are care about what the organic eggs have contained, and the effectiveness after using them. In addition, the customers would notice the prices of the organic eggs. The customers also consider seriously about the safety of eating organic eggs. If the FCE have continued to provide the greatest organic eggs with cheaper price, the customers would continue to purchase good products.

Segmentation 2 —Product Oriented

Segmentation 2 contains least consumers and focused on the product oriented. As the result, when the customers purchase the organic eggs, they think the product would be fit their identities, and it is fashionable to eat the organic eggs. When the prices of the organic eggs are the same, the main factor for consumers to choose is the weight, the size, and the package. The promotion that FCE could do is to show the consumers that eating organic eggs is a fashionable thing to do and would have high identities.

Segmentation 3 —Production Oriented

The Segmentation 3 is focused on production oriented. When the customers purchase the products, they would think over and over about how the organic eggs would be produced, and

if there is any authentications on them. Because the cost of the organic eggs is higher, they would be examined very carefully. Different steps of the production eggs are important and should be under control. The consumer would show their expectation when the FCE have produced their organic eggs by law and regulations.

From the numbers of the three major segmentations, researchers know that the most of the customers are in the segmentation 1, and they could be posited the products in having the good price and the ingredient. Before the FCE provide the products to the public, the FCE need to know what are purposes for the customers to purchase the products. Different customers have different purposes on buying the products; so the FCE should provide high quality organic eggs to the consumers.

Conclusions

The organic eggs are popular in Taiwan, and the customers would purchase the products that are unique and have high quality in famous brands. The government of Taiwan should notice that the producing the organic foods is the tendency. The consumers should not be provided by the polluted and contain the medicine products. The government should set up the laws and regulations to protect the consumers.

From the data, there are only 177 people have purchased the organic eggs. The researchers divide it into three segmentations, which are "Product Oriented", "Economic Oriented, and "Production Oriented". From the numbers of the segmentations, most of the customers care about the ingredient, price, brand, and unique of the organic eggs. In addition, during the FCE sell the organic eggs; the government of Taiwan should set up the laws and regulations to protect the consumers. Providing the high quality products to the customers is the main thing that the FCE should reach.

To name the different segmentations, the researchers are not only used x^2 the highest average in factors but also could use Scheffe's post-comparison to compare the differences between the three factors.

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