Utilizing the Kano Model to Investigate Quality Attributes of Green Tourism

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ABSTRACT

In recent years, global climate abnormalities and disasters happening everywhere have made people begin to emphasize the issues of environmental protection, energy consumption and carbon reduction. In addition, green consumerism and the green energy industry have become hot topics globally. As the national income increases, tourism has become a part of many people's lives. Since the demand for tourism among modern people is inevitable, a green tourism model is emerging, which emphasizes high efficiency, low consumption, and minimizing damage to the environment. So far, the tourism and service industry in Taiwan has started on a trend towards low carbon. Green tourism has transformed from ecology tours in mountains and woods into tours placing more emphasis on environmental protection and carbon reduction for people to enjoy and experience cultural ecology. The objective of this research are to: (1) analyze the two-dimensional quality element attributes of services in green tourism products, and (2) investigate the differences of demographic variables on the two-dimensional quality attributes of services in green tourism products. This research sums up 8 attractive quality elements, 13 linear quality elements, and 3 indifferent quality elements in 24 green quality elements. There are no must-be quality elements or reverse quality elements, which shows green tourism products have a positive effect on improving consumer satisfaction.

Keywords: tourism products, green tourism, low-carbon tourism

INTRODUCTION

In recent years, global climate abnormalities and disasters happening everywhere have made people begin to emphasize the issues of environmental protection, energy consumption and carbon reduction. Green consumerism and the green energy industry have also been flourishing globally, and the attitude and behaviors of people towards the earth are beginning to change. In addition, the tourism behaviors have also changed, including the rise of riding bicycles, the rise of ecological tourism, and so on (Zhuang, 2010).

The promotion of low-carbon tourism in Taiwan currently is beginning in the Pinglin district of New Taipei City. It is mainly focused on reducing carbon emissions from transportation during tourism activities. Moreover, a low-carbon tourism service center has been set up for people to inquire about tourism and low-carbon diet information. Since the government began promoting a free low-carbon package tour in 2008, it has created not only super-low carbon emission tourists, 4.55 kg per person, but also new business opportunities for local shops. So far, Shuangxi, Green Island, Siaoliouciou, Kinmen, and other places have started to conduct low-carbon tourism construction in succession, meaning that low-carbon tourism has gradually become valued.

Green low-carbon tourism often means not only energy conservation and environmental protection, it also generates extra expenses to consumers, such as the extra cost to rent a bicycle or motor bike, the labor paid when walking or riding a bicycle, the inconvenience compared to riding a motor bike or driving a car, and so on. These disadvantages and inconvenience made many consumers feel reticent. The government is mainly responsible for planning the low-carbon tourism products currently available in Taiwan, and the price of the products government provides to people is very low or even free. Although the government has received many great responses, it is still doubtful if people are really taking to green tourism, environmental protection and carbon reduction or if they are attracted by the low price of the tourism products during an economic downturn.

The idea in the past was always that the more product functions or contents of services there were, the more satisfied the consumers were. However, consumers take some items for granted. They regard some items as not influential at all, and they are even displeased by some items. Therefore, the essential demand is people in the tourism industry cannot ignore customer value when they design tourism products. They have to fully understand what customers' thoughts are concerning quality so that they can make the most of the resources invested.

This research expects to find the elements that actually influence customer satisfaction in order to summon the resources on the construction of the key quality elements by referring to the contents of existing low-carbon tourism products through Kano model. The objective of this research is twofold:

(1) to analyze the two-dimensional quality element attributes of services in green tourism products.

(2) to investigate the differences of demographic variables on the two-dimensional quality attributes of services in green tourism products.

Based on the research motivation and purposes, this research employs a Kano two-dimension quality model, which classifies the quality elements into four categories. These include the indifferent quality, which has no influences on the satisfaction of the

customers, the attractive quality, which can stun customers and noticeably improve customer satisfaction, the one-dimension quality, which has a linear relation with customer satisfaction, and the must-be quality, which does not improve satisfaction but is inevitable. The Kano model can be applied to analyzing the demands of consumers on real products or intangible services, and it further sums up the quality elements actually influencing customer satisfaction.

After the research topic and purposes are established, the research finds out the quality elements of low-carbon tourism through literature review and confirms whether all the listed quality elements are suitable through interviews with experts. Later, the questionnaire using the questions in the Kano model is designed and established. Subjects sent questionnaires are mainly tourists participating in low-carbon tourism in Pinglin. These questionnaires can sum up all kinds of different quality elements thought the special positive and negative questions in the Kano model.

The information analysis will be conducted after returning the questionnaires. The result of the opinions of different customers attributes described focusing on the research purposes and different demographic variables on all the quality elements attributes during low-carbon tourism will be archived and the findings of the research will be proposed.

LITERATURE REVIEW

The Characteristics and Status of the Tourism Industry

As the economy continues to flourish, the national income is increasing significantly. Consequently, people in Taiwan are beginning to pursue increases in quality of life. Because of that, recreation and tourism are becoming the consumer products people utilized most in their spare time. This is making the tourism industry flourish. In fact, The World Tourism & Tourism Council, WTTC, announced that the tourism industry became the biggest industry in the world in 1992. Global tourism revenues total about 3.5 trillion US Dollars, making up about 6% of total global revenue. This industry offers 127 million jobs, which means 1 out of 15 employed people in the world is engaged in the tourism industry. The tourism industry was severely affected by the global economy recession in 2009, and GDP decreased by 4.8%. However, the tourism industry still offered over 235 million jobs globally, even during the recession. The net growth of GDP in the global tourism industry was 0.5% in 2010, which was 4.8% more than the net growth in 2009. However, it is estimated that the net growth will average 4.4% annually in the next 10 years. The 235,785,000 jobs offered in 2010 are also estimated to grow to 303,019,000 in 2020. The number of the jobs offered by the tourism industry is 8.6% of that offered by all the industry, meaning 1 out of 12.3 jobs comes from tourism industry in 2010. In 2020, the forecasted number of the jobs offered by the tourism industry will be 9.2% of that offered by all the industry, meaning 1 out of 10.9 jobs come from the tourism industry (World Travel & Tourism Council, 1992).

Green Tourism

Like the rapid change of the global environment, the environmental change in the tourism industry is getting fiercer. The emerging issue of environmental protection also has influences on the demands for tourism products.

The experience of tourism is the core of tourism products, which has influences on the satisfaction of the customers. In addition to the charm and character customers can feel from tourism itself, customers mainly feel the service they receive, including the plan of the tour, the professionalism of the tour guide, the completeness of the related facilities, and so on. The difference between tourism products and general services is that consumers need to pay for tourism products in advance, so consumers cannot feel whether the product is either good or bad until a while later. Therefore, how well the people in tourism industry market their tourism products is closely related to whether consumers are willing to try the tourism service.

Many researchers point out that the designing and developing phase of most products can determine 70% to 80% of the developing cost and environmental impact, but the cost of the phase only takes up 6% of the whole product development (Shehab, 2001). Therefore, the earlier the complete product life cycle is taken into consideration, the more costs can be saved and environmental impact reduced. Thus, it can be seen that the importance of the designing phase on the whole development of the tourism product.

Green Design puts the demand for green products into practice. It can also be called ecology design, life cycle design, or environmental design. This is a modern design method that considering environmental impact and resource efficiency comprehensively (Li, 2005). Guo (2001) pointed out that the central idea of green design is "green life cycle design", and the main point is not only how to recycle waste. It is more important to make designers consider the potential impact on the environment from the products prior to the forming of concepts. Furthermore, designers should design products from the angle of reducing environmental impact to reduce the harm on the environment. The green life cycle consists of four main phases: production phase, transportation phase, utilization phase, and regeneration phase.

In the past, most people looked for development at the cost of damaging the environment and later protected the environment at the cost of sacrificing development speed. The root cause is that people's environmental protection awareness is insufficient (Yin & Wang, 2006). Tourism activities in the past were always seen as less predatory to environmental resources. However, the number of tourists has increased greatly in recent years. As the quality of tourists, the utilizing method, the utilizing degree, the time of event, the location of event, and other factors becomes improper, the natural environment, social culture, and livelihood and economy of the tourist spots all become disturbed, destroyed, or even vanished (Song, 2000).

Tourism development using rural villages, fishing villages, and mountain villages as resources is called "green tourism". It is also called countryside tourism or agriculture (or rural village) tourism because green tourism is based on the rural areas full of rural scenery. It originally rose after Industrial Revolution in Europe, with the purpose to promote the communication between cities and rural villages. On the one hand, it brings recreation to residents in cities; on the other hand, it drives the development of rural areas. The word "green" includes the meaning of planting trees and beautifying the environment. When people are bathed in a green environment for a long time, they will have a change of values. After a view of value full of environmental protection awareness sprouts, it will further affect lifestyles, making people naturally generate a kind of action to cherish and protect the environment. This kind of lifestyle mixing with nature can be experienced in rural villages, fishing villages, mountain villages, and other areas. Moreover, these areas can revitalize the local economy and promote local development through the consumption activities of tourists (Shen, Sen & Hao, 2006).

"Low-carbon tourism" means a new type of tourism and consumption mode where tourists have "low-carbon" awareness during tourism activities to restrict carbon emissions to a reasonable level and reduce carbon emissions as much as possible. In other words, "low-carbon tourism" is a kind of tourism consumption activity that advocates low-carbon diet, low-carbon accommodation, low-carbon tourism, low-carbon tour, low-carbon recreation, and low-carbon shopping (Zheng & Lin, 2010).

Simpson, Gössling, Scott, Hall, and Gladin (2008) think people can conduct low-carbon tourism through the following ways: 1) Stay at the destination for a longer time, 2) Try to reduce air travel as much as possible, 3) Support an airline with sound environmental management, 4) If air travel is unavoidable then carbon offsets could be implemented. 5) Tour operators supporting environmental protection and benefiting the environmental development, 6) Stay at a destination that has an environmental protection certificate.

Since 2008, the Environmental Protection Department of New Taipei City government has cooperated with the Pinglin local government to host low-carbon tourism in Pinglin and to establish a local low-carbon tourism service center. This action created 400 thousand tourists and a tourism consumption of NT$ 410 million annually, which successfully increased the number of tourists, perked up the local economic development in Pinglin, and even achieved the brilliant performance of reducing carbon by more than 7,536,248 kg (equal to planting 1,545,027 trees in a year). The way to handle this is to host low-carbon tourism on two weekdays so that the rush hours can be avoided to reduce environmental impact. Moreover, it combines green transportation, low-carbon shops, ecological tourism, low-carbon tourist behaviors, trash reduction, carbon currency voucher consumption, and other actions to develop a low-carbon tourism model having local characteristics (Low-carbon life net, 2013).

Kano Two-dimension Quality Model

This concept originates from the Motivator-Hygiene Factor Theory (or the Two Factor Theory) of psychologist Frederick Herzberg in 1959, which mainly reviews the factors influencing the job satisfaction of employees. The theory asserts that whether the employees are "satisfied" or "unsatisfied" is not the traditional dichotomy and that there should be a grey zone of "not satisfied" and "not unsatisfied" existing between them. In other words, the opposite side of "satisfied" is not the traditionally considered "unsatisfied" but the two parallel double continuous strips. Under this theory, the opposite side of "satisfied" is "not satisfied" and the opposite side of "unsatisfied" is "not unsatisfied."

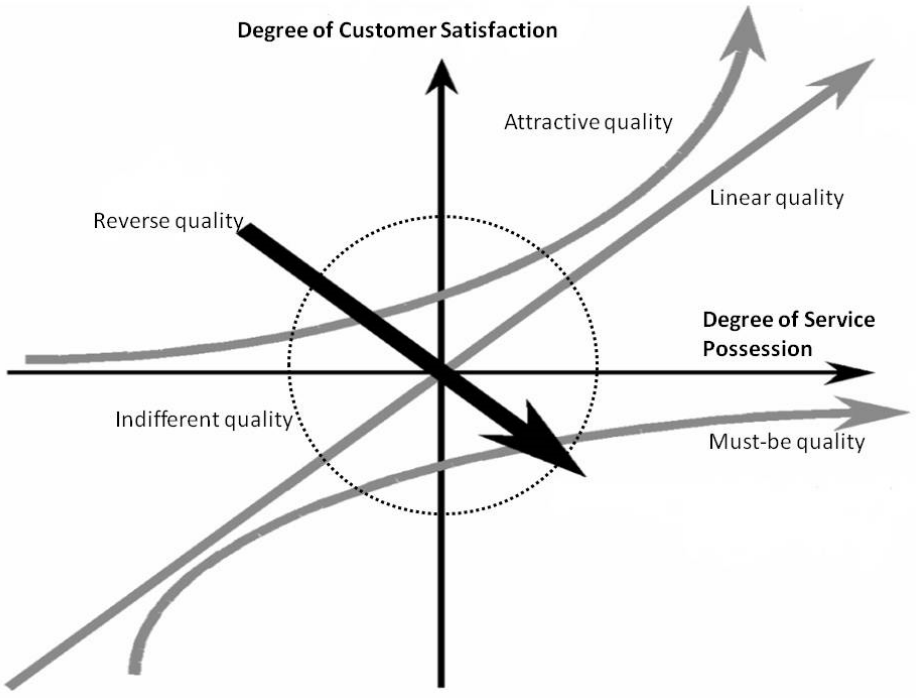
The Kano model transfers the level of quality elements possessed and the level of customer satisfaction into X-coordinates and Y-coordinates. X-coordinates are the level of quality elements possessed, and the more the scale goes to the right, the more abundant the level of quality elements possessed is. On the other hand, the more the scale goes to the left, the more defective the level of quality elements possessed is. Y-coordinates are the level of customer satisfaction. The more the scale goes up, the more satisfied customers are. The more the scale goes down, the less satisfied customers are. Use the relative relations between X-coordinates and Y-coordinates to classify the quality attributes into the following five types (Wu, 2007), shown as Figure 1:

1. Attractive quality: When this item exists, customers will be very satisfied. On the other hand, even if the item did not exist, customers would not be unsatisfied.

Attractive quality must occur under conditions where customers will not anticipate it in advance, in order to surprise them.

2. Must-be quality: When this item exists, it will not make a customer feel satisfied. However, once the item does not exist, it will immediately make customers feel unsatisfied. It is also called expected quality.
3. Linear quality: The more abundant the item supplies, the more satisfied customers are. The lower the item supplies, the more unsatisfied customers are, meaning that there is a linear relation between the satisfaction of customers and the supply of quality elements.
4. Indifferent quality item: Whether the quality item exists or not will not influence the satisfaction of customers.
5. Reverse quality: The existence of this quality item will make customers feel unsatisfied, while non-existence makes customers feel satisfied, meaning this quality elements should be abolished or fixed.

Figure 1: Kano Quality Model



Source: Matzler & Hinterhuber (1999)

RESEARCH DESIGNATION AND ANALYZING METHOD

Research Subject

The main target of this research is the green tourism package tour schedule of the Pinglin District of New Taipei City, Taiwan. The main research subjects are tourists attending the "Pinglin green low-carbon tourism" package tour promoted by the New Taipei City Government and local office together. Although other areas have also started green tourism, the Pinglin District is the founding spot for green low-carbon tourism and it is the longest low-carbon tourism scenic spot in Taiwan. Therefore, whether it is hardware or software, green tourism in the Pinglin District is more complete than other areas.

Kano Questionnaire Designation

The questionnaire in this research is classified into two major parts. The first part is the survey of the two-dimension quality attributes of quality items. This part first refers to the green tourism product life cycle proposed by Gao (2003) as the main constructs. Then, the green tourism principle proposed in literature is referenced to establish 24 concrete elements quality of green tourism, which are listed as Table 1. The second part is the personal information of tourists, including the survey of the willingness to pay and the incentives to attend.

Data Analysis Scheme

This research uses the Kano Two-dimension Quality Model as the principal axis, and first uses green life cycle as the main construct. Then, this research is supplemented by green tourism principles to establish all quality elements. The attributes identification of all the quality elements from every survey respondent can be summed up through the special design of the Kano questionnaire. In addition to using the Chi-square test to test whether there is a significant difference among different groups of consumers on the identification of quality attributes, we also conduct Chi-square test on tourists' incentives to participate and willingness to pay in green tourism. In addition, we conduct a post hoc analysis on the groups with significant difference to realize the main groups of consumers of green tourism and their main demands more clearly. There are two analysis tools adopted in this research. One is SPSS statistical analysis software package, used to execute related statistical tests. The other is the two-dimension quality classification table used as a tool to classify quality elements. The attributes of the question items in the questionnaire of this research adopt the quality classification table proposed by Matzler and Hinterhuber, shown as Table 2.

Table 1: The Construct and Quality Elements of this Research

Construct	No.	Quality Element
Tourism Planning	Q1	Head for the destination by mass transportation or shuttle bus
	Q2	On foot, by motor bicycle, or by bicycle for single-site tourism
	Q3	Mainly use local ingredients for local specialty food
	Q4	Not too many tourist spots, but the tour guide explains every tourist spot in great details
	Q5	Diverse tour content
	Q6	No special physical limitation for visiting natural environment
	Q7	Allocate means of transportation according to different ages
	Q8	Avoid the high tourism season, and host low-carbon tourism on non-holidays or low tourism season
	Q9	There is a limitation for the number of people in every echelon, so every tour guide takes fewer team members
	Q11	Blend green concept into local tourism season or festivities
	Q12	Use “green tourism” or “low-carbon tourism” as the advertising slogan
Utilization	Q10	Experience and realize local culture
	Q13	The guide informs of appropriate behaviors during low-carbon tourism in advance
	Q14	Include many educational activities during the tourism
	Q15	The guide provides tourists some small tips of reducing carbon in daily lives
	Q16	The guide does not disturb the local ecological environment during the tourism
	Q17	The guide does not harm the environment during the tourism
	Q19	The guide provides a detailed and professional introduction on the local natural ecology and history and human culture
	Q20	The guide will keep tourists from harming ecological or historical sites
	Q21	The guide encourages tourists to join the life of local residents and realize the local culture
Regeneration and feedback	Q18	The guide and local residents are all dedicated to maintaining the local environment
	Q22	The tour guide has a detailed introduction and promotion on the local specialties
	Q23	Tourists shop by using carbon currency voucher, and the local shops donate part of the revenue as the fund of planting trees
	Q24	Choose the mountain areas whose economic development is slower or the remoter mountain areas to be the places to promote low-carbon tourism

Table 2: Two-dimension Quality Attributes Classification Proposed by Matzler and Hinterhuber

Lack / Possess	Like	Take For Granted	No Feeling	Bearable	Dislike
Like	Invalid	Attractive Quality	Attractive Quality	Attractive Quality	Linear Quality
Take For Granted	Reverse Quality	Indifferent Quality	Indifferent Quality	Indifferent Quality	Must-be Quality
No Feeling	Reverse Quality	Indifferent Quality	Indifferent Quality	Indifferent Quality	Must-be Quality
Bearable	Reverse Quality	Indifferent Quality	Indifferent Quality	Indifferent Quality	Must-be Quality
Dislike	Reverse Quality	Reverse Quality	Reverse Quality	Reverse Quality	Invalid

Source: Matzler & Hinterhuber (1999)

Kano Quality Improvement Index

This research adopts the Quality Improvement Index defined by Matzler and Hinterhuber (1999), also called the coefficient of customer satisfaction, to show the effect generated from some quality element, the formulas are as follows:

$$\text{The index of improving satisfaction} = \frac{A+O}{A+M+O+I} \quad (1)$$

$$\text{The index of reducing dissatisfaction} = \frac{M+O}{(A+M+O+I)\times(-1)} \quad (2)$$

In the formulas, O is linear quality, A is attractive quality, M is Must-be quality, and I is indifferent quality. The -1 multiplied at the denominator is to emphasize the impact on the dissatisfaction of customers.

The Quality Improvement Index means the effect of improving the satisfaction of customers or reducing the dissatisfaction of customers when a quality element is improved or increased, and it is a concept of proportion. It uses the addition of the proportion of attractive quality to the proportion of linear quality as the index of improving satisfaction and uses the addition of the proportion of linear quality to the proportion of must-be quality as the index of reducing dissatisfaction. These two make up the insignificance when Kano model adopts relative majority as the way to classify attributes.

RESULTS AND DISCUSSION

Sample Data Structure

There were 249 questionnaires sent and 223 valid questionnaires were returned. The percentage of valid questionnaires is 89.56%. Table 3 is the basic data structure analysis of the survey respondents.

Table 3: Basic Data Structure of Survey Respondents

Attribute	Item	Frequency	Percentage
Gender	Female	160	71.7
	Male	63	28.3
Age	Less than 20	8	3.6
	20~29	37	16.6
	30~39	37	16.6
	40~49	48	21.5
	50~59	54	24.2
	More than 60	39	17.5
Educational Background	Under junior high school	27	12.1
	Senior high school	56	25.1
	College or university	110	49.3
	Graduate school or higher	30	13.5
Income Level	Low	94	42.2
	Low to medium	61	27.4
	Medium to high	37	16.6
	High	31	13.9
Marital Status	Unmarried	80	35.9
	Married	62	27.8
	Married with child	81	36.3
Customer Category	Potential customer	165	74.0
	Existing customer	58	26.0
Tour Companions	Family Members	51	22.9
	Friends	152	68.1
	No companions (alone)	9	4.0
	Others	11	4.9

Reliability and Validity

Cronbach's α coefficient is used to examine the reliability of every construct of the questionnaire. The α coefficient means the coherency function of the internal factor of the construct. The reliability of the construct means whether the question items included can represent the construct. In general, α coefficient is acceptable when it is bigger than 0.50. This research adopts product life cycle as the construct of quality elements. In this

research, the reliability value of the constructs of "Tourism Planning" and "Utilization" are both higher than 0.7, meaning it is highly reliable; the construct of "Regeneration and Feedback" is also 0.5, showing that the questionnaire has reliability.

Validity means the correctness of the research, meaning that the accurate level of the measuring tool to measure the desired characteristics or functions. The judgment is based on whether the logic foundation exists, so it is more subjective. The questionnaire in this research refers to the principles related green tourism proposed by many scholars. We pay an actual visit to Pinglin to query the contractors of green tourism for their opinions. Finally, we finished the questionnaire after expert and scholar review, in order to shows that the questionnaire has content validity.

The Attributes Classification of the Kano Quality Elements

Transfer the feelings of survey respondent on having and not having all the quality elements into the attribute definition of quality elements through two-dimension quality classification table, and then conduct the classification. There are 8 attractive quality elements, 13 linear quality elements, and 3 indifferent quality elements included, as show n in Table 4.

In the 8 attractive qualities, we consider that Q1 means not only an environmental friendly tourism way to consumers but also a lower price under the economic recession. Q3, Q5, and Q10 all have a meaning of in-depth tourism, meaning that consumers started to abandon a culinary tour in the past and expect to experience real local culture during the tour. Q11, Q12, and Q15 mean that consumers definitely hold a positive attitude towards environmental protection, which will also affect the satisfaction of consumers concerning the tourism product. Q22 means that consumers are willing to consume. Although their purposes might not be caring about the local economic promotion, the result still meets the purpose of green tourism.

There are no must-be quality elements and reverse equality elements in it. We assert that the main reason is green tourism package tours are an emerging tourism product and most tourists cannot identify which quality element is required because their involvement is too low. Also, reverse quality does not exist in the identification of most consumers, so we believe that most participants can accept this kind of tourism product. Even from the situation that the total number of linear quality and attractive quality is higher than that of indifferent quality can we see that consumers are very likely to be quite fond of these emerging tourism products.

Table 4: Kano Quality Classification

Classification	Quality Items
Attractive Quality	Q1, Q3, Q5, Q10, Q11, Q12, Q15, Q22
Linear Quality	Q2, Q4, Q9, Q13, Q14, Q16, Q17, Q18, Q19, Q20, Q21, Q23, Q24
Indifferent Quality	Q6, Q7, Q8

Quality attributes explain the relation between its quality elements and the satisfaction of customers, and quality improvement index explains the affecting level of quality elements and the satisfaction of customers. The result of ordered improving satisfaction index and reducing dissatisfaction index respectively is shown in Table 5.

Table 5: Quality Elements of Improving Satisfaction Index and Reducing Dissatisfaction Index

No.	Improving Satisfaction Index	No.	Reducing Dissatisfaction Index
Q19	0.74	Q18	-0.87
Q4	0.71	Q17	-0.85
Q10	0.70	Q20	-0.85
Q24	0.70	Q19	-0.75
Q23	0.70	Q21	-0.62
Q15	0.69	Q16	-0.61
Q21	0.69	Q4	-0.57
Q22	0.68	Q9	-0.55
Q18	0.68	Q13	-0.53
Q2	0.67	Q23	-0.52
Q16	0.67	Q24	-0.44
Q12	0.66	Q2	-0.43
Q9	0.65	Q22	-0.39
Q3	0.65	Q14	-0.38
Q17	0.64	Q1	-0.38
Q20	0.64	Q15	-0.37
Q1	0.64	Q12	-0.37
Q11	0.63	Q3	-0.35
Q13	0.62	Q10	-0.31
Q14	0.62	Q11	-0.29
Q5	0.56	Q7	-0.26
Q6	0.53	Q8	-0.24
Q8	0.52	Q6	-0.21
Q7	0.50	Q5	-0.20

The Correlation between the Demographics of Tourists and Quality Attributes

1. The relevance between gender and quality elements

This research found that there is no significant difference between male and female concerning most of the quality element attributes. Only Q12 judges that there is a significant difference between different genders on the definition of this quality element attribute through the Chi-square test. However, although males and females both identify Q12 as an attractive quality, the effect of this quality element on improving satisfaction or reducing dissatisfaction is better in females than males. Therefore, we can infer that the importance of this quality element to females is slightly higher than to males.

2. The relevance between age and quality attributes

When adopting age as the way to separate consumers, we can find significant difference in totally 10 quality elements, including Q1, Q2, Q3, Q4, Q10, Q11, Q13, Q15, Q17, Q18, and Q23.

Through quality improvement index, we can find that Q1 and Q2 have the biggest influence on consumers under the age of 20 no matter if it is improving satisfaction or reducing dissatisfaction. These two quality elements both emphasize public transportation. If Q3, Q4, and Q10 are improved, the effect of improving satisfaction is the best towards the consumer group between the ages of 50 and 59. The effect of reducing dissatisfaction is the best towards the consumer group under the age of 20. By observing these three quality elements, we can find that all of them include the concept of "in-depth tourism" which is to experience local characteristics. On Q11, the effect of improving satisfaction or reducing dissatisfaction is still better toward the tourists under the age of 20, but tourists above the age of 60 emphasize this element relatively less. On Q13, Q15, and Q18, the tourists under the age of 20 emphasize this kind of element relatively more than other groups. However, the satisfaction of consumers who are between the ages of 20 and 29 emphasize the new addition or improvement of this kind of element relatively less than other groups. Q23 has a significantly better effect of improving satisfaction or reducing dissatisfaction on the group under the age of 20 and the group between the ages of 50 and 59 than other groups. The index of reducing dissatisfaction for tourists between the ages of 30 and 39 is slightly lower.

In summary, the improvement or the addition of the above quality elements has a better effect of reducing dissatisfaction toward the group under the age of 20. Therefore, we consider that the involvement of the tourists under the age of 20 might be relatively higher than that of other groups, and that they are especially interested in elements including "the concept of carbon reduction."

3. The relevance between educational background and quality attributes

Consumers with different educational backgrounds have a significant difference in their opinions of the quality element attributes of Q2, Q5, and Q23. On Q2, the index of improving satisfaction of the consumers whose highest educational background is junior high school is significantly lower; while that of the consumer group whose educational background is senior high school is relatively higher than other groups. On Q5, the effect of improving satisfaction of the tourists whose educational background is graduate school or higher is the best. That of the tourists whose educational background is senior high

school is the second. However, the effect of reducing dissatisfaction is poor in all groups, especially the group whose highest educational background is junior high school. However, on Q23, the effect on the consumers whose highest educational background is junior high school is significantly lower no matter it is the effect of improving satisfaction or the effect of reducing dissatisfaction.

4. Distinguish quality attributes according to income level

Under the consumer separation of income level, there are significant differences between different groups on totally two quality elements, which are respectively Q3 and Q23. On Q3, the index of improving satisfaction for the group whose income level is high is significantly higher than other groups. While on the effect of reducing dissatisfaction, the group whose income level is high (including those whose income level is medium to high) is higher than the group whose income level is low (including those whose income level is medium to low). On Q23, the effect of improving satisfaction for the group whose income level is high is still the best, while the effect of improving satisfaction and the effect of reducing dissatisfaction for the tourists whose income level are medium to low are both significantly lower the other groups.

5. The relevance between marital status and quality attributes

Under different marital status, the attributes of Q1, Q3, Q8, Q16, and Q22 are known to have significant differences in all groups through the Chi-square test. On Q1, there is a relatively majority of unmarried people who identify it as the attractive quality, whose effects of improving satisfaction and reducing dissatisfaction are both lower than married people (including married group with child). On Q3, the effect of improving satisfaction of the married-with-child group is the best, and the effect of reducing dissatisfaction of the married group is the best. Overall, on Q8, no matter if the effect of improving satisfaction or reducing dissatisfaction is low, it shows that Q8 is not the element consumers emphasize. On Q16, the effect of improving satisfaction of the married-with-child group is the best, but the effect of reducing dissatisfaction of the unmarried group is the best. On Q22, the affecting effect of the satisfaction of the unmarried group is significantly lower than the other two groups, showing that the unmarried group pays relatively low attention to Q22.

6. The relevance between customer attributes and quality attributes

This research separates customer attributes into potential customers and existing customers, and we found that there are significant differences in four quality elements: Q1, Q2, Q3, and Q4. In addition, the effects of improving satisfaction and reducing dissatisfaction are both better on existing customers than on potential customers. Existing customers regard Q1, Q2 and Q3 as linear quality, while most customers regard those as attractive qualities; so we realize existing customers have a slightly better understanding concerning the contents of green tourism.

7. The relevance between the types of tour companions and quality attributes

If we use the types of tour companions as the variable to separate consumers, there are significant differences in the interval between all consumer groups on the attributes of three quality elements, which are respectively Q10, Q14, and Q24. Through the Quality Improvement Index, we find that Q10 and Q14 have the highest index of improving

satisfaction on tourists with no tour companions. On Q24, the effect of reducing dissatisfaction is higher on the group whose tour companions are family members; while the effect is significantly lower on the group whose tour companions are others.

CONCLUSION

Characteristics of Consumers

As far as the proportion of gender on the number of consumers, the proportion of female is significantly higher than that of male. It might be because females have a stronger sensitivity and emphasize social care and the issue of environmental protection more than males. On the distribution of ages, more than half of the consumers are above the age of 40. The reason is consumers who have retired and who are above the age of 40 have more leisure time. If we hope to expand the market to the younger age groups, the suggestion is to host green tourism on holidays and support it with traffic control in case the tour resources are stretched. The majority of the tourists are those whose educational background is college or university. The probable reason is that this group has stronger environmental protection awareness than other groups and it shows the popularity of higher education in Taiwan currently. However, the research mainly focuses on the consumers whose income level is lower. Marital status does not make a big difference on this, only the proportion of married group with child is slightly higher, so we propose that the consideration of the safety of children must be enhanced in the design of tourism planning.

Quality Element Attributes

This research conduct analysis on totally 24 quality elements through Kano model, and found that there are totally 8 attractive quality elements, 13 linear quality elements, and 3 indifferent quality elements. In the survey of this research, there are quality elements classified as must-be quality, and the main reason is that the majority of consumers have a very low understanding about the content of green tourism. In addition, this research only reviews “green” quality elements and the basic element levels of general tourism products are not included, so the nonexistence of must-be quality is also normal. In addition, reverse quality also doesn’t exist in all the quality elements, so this research considers that making the tourism products green has a positive effect on improving the satisfaction of consumers. This research suggests that government or enterprise emphasize the improvement of attractive quality elements when they are developing green tourism products in the future. In addition, this research suggests the tourist industry cooperate with the transportation industry, which has the certification of environmental protection to reach the purpose by providing shuttle bus, and try best to cooperate with public transportation on the place to take shuttle bus.

The characteristic of attractive quality is that when having or improving this kind of quality element, consumers easily felt surprised and it would show an increasing effect on the improvement of satisfaction. However, when it is compared with must-be quality on which one is more important, we must consider enterprise strategies and product life cycle to decide. If the enterprise or the product is at the phase of developing, improving

the satisfaction of consumers is helpful for expanding market. However, if the enterprise or the products is in the stable condition, reduce the dissatisfaction of consumers as much as possible may be the key to sustainable operation.

The characteristic of linear quality is the same as the quality concept in the past. The more and the more complete the linear quality in the products is, the higher the satisfaction of consumers is. However, what needs to be noticed is that the attributes of quality elements will change as the development of science and technology. Linear quality nowadays could be must-be quality in the future, so do not invest most resources into the development of attractive quality and ignore the establishment and maintaining of linear quality.

Emphasizing on three indifferent quality elements, this research considers the majority of the consumers not being able to realize the safety meaning in "No special physical limitation for visiting natural environment" (Q6) and "Allocate means of transportation according to different ages" (Q7) doesn't mean that "Whether the tour schedule and transportation are adequate" is not important. In addition, the main reason why "Avoid the high tourism season, and host low-carbon tourism on non-holidays or low tourism season" (Q8) is an indifferent quality is that consumers do not realize the issues related to the moderate exploitation of tourism resources. However, the tourism operators still need to try to balance the usage degree of tourism resources in low season and in high season, because it is the key to whether the tourism spot can operate sustainably.

Quality Improvement Index

Through the calculation results of quality improvement index, this research found that the indexes of improving satisfaction of all quality elements are all between 0.50 and 0.74. The difference is small, showing that most of the quality elements have a certain degree of influence on the satisfaction of consumers.

However, there are bigger differences in the effects of reducing dissatisfaction of all quality elements. Among those quality elements, Q17, Q18, and Q20 are classified into linear quality by relative majority of tourists, but the absolute value of the index of reducing dissatisfaction of these three quality elements are bigger than 0.8, meaning that still few tourists identify these 3 quality elements as must-be qualities. According to the commonalty of the content of these 3 quality elements, this research asserts that the environmental protection awareness of local residents and tour guides and whether they actually execute environmental protection themselves are more basic elements compared to other quality elements. Therefore, this research considers that the operator in tourist areas and the planner of green tourism products both need to reach an agreement for maintaining tourism resources, together with local residents, to enhance the educational training of guides or tour leaders to improve their professional level and environmental protection awareness. After all, the guides are the frontline staff to influence the satisfaction of tourists in the entire service processes and key to whether green concept can be successfully rooted deep inside the minds of consumers through tourism.

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