Discussing the Effect of Service Innovation on Customer Satisfaction Based on Statistics Education – A Case on Qianjiangyue Leisure Farm

Shui-Sheng Fan 1, You-Cheng Chen 1*, Lu Miao 1
1 Anxi College of Tea Science, Fujian Agriculture and Forestry University, Anxi County, Fujian Province, CHINA

Received 27 December 2017 • Revised 3 March 2018 • Accepted 23 March 2018

ABSTRACT
Service innovation has been constantly emphasized domestically and internationally. The factors of globalization, changing lifestyles, and the transfer of industrial focus indirectly create business opportunities for leisure farms. To attract more customers for surpassing competitors, the cultivated service innovation capability must present uniqueness and match with customer needs. Based on statistics education, this study intends to discuss the effect of leisure farms’ service innovation on customer satisfaction. Employees of Qianjiangyue Leisure Farm, as the research samples, are distributed 330 copies of questionnaire. Total 278 valid copies are retrieved, with the retrieval rate 84%. The research results conclude significant correlations between 1.service innovation and customer satisfaction, 2.statistics education and service innovation, and 3.statistics education and customer satisfaction. According to the results, suggestions are proposed, expecting to assist leisure farms in service innovation and the promotion of customer satisfaction.

Keywords: statistics education, leisure farm, service innovation, customer satisfaction

INTRODUCTION
The public has stressed more on the quality of life in past years. The popularity of national tourism obviously increases the expenditure on tourism. People can easily acquire sufficient information of tourism and are favor of more characteristic and innovative locations and methods. Besides, the government positively marketing tourism has largely increased the demands that leisure farms are flourishing. Nevertheless, lots of unique and novel business opportunities have been derived in various industries. In face of the trend and challenge of merchandizing products and services, enterprises have to develop competition patterns different from the past. Leaders therefore cannot satisfy with current situations, but should constantly pursue innovation to reduce costs or enhance services. Positively improving existing products or services and even constantly developing new products or service could largely enhance customer satisfaction with such products or services. Service industry has gradually become the key branch of economy in various countries to come out with the idea of service innovation.

The focus of service lies in consumers’ constantly updating experience, and enterprises have to provide better services to attract and satisfy consumers. The diverse consumer needs advance the development of service innovation. Such changes also result in distinct challenges for leisure farms. Leisure farms regard the quality of service as the basis, aiming to have the services and equipment achieve certain standard and promote the quality up to the same as international level. Nonetheless, a lot of industries do not simply pursue service quality, but regard service innovation as the goal at the next stage and enhance the competitiveness and surpass competitors through innovative strategies. Apparently, service innovation is relatively important for leisure farms. Based on statistics education, this study intends to discuss the effect of leisure farms’ service innovation on customer satisfaction.
LITERATURE REVIEW

Service Innovation

Tseng and Lee (2014) mentioned that everyone had the experience in service innovation, which could be driven by technology to widen the service coverage and reduce service costs; in other words, whatever different from the original forms could be regarded as new service. There were several types of service innovation. For instance, service staff in an airplane or a restaurant could better understand customer needs or preference. Cox (2013) pointed out service innovation as enterprises enhancing the product or service value to cope with customer needs for diverse products and services. In this case, market needs were the major factor in service innovation to correspond to the international development trend of Taiwan. Namkung and Jang (2013) proposed the definition of innovation as the behavior creating wealth with resources; as long as an organization being able to create value with existing resources, it was regarded as innovation. Innovation was the purposive and regular activity and could create higher added value; innovation did not necessarily involve in technology and might even not require a physical object. It was also considered that most successful innovation was achieved through changes to create novel and different value and satisfaction. Josiam and Henry (2014) explained service innovation as enterprises promoting the product or service value to cope with customer needs for diverse products and services, and market needs were the major factor in service innovation to correspond to the development trend of international industries faced by Taiwan. Armstrong and Kotler (2014) proposed that catering to different demands of time background and competition methods could help enterprises’ business competition, keep with the time, and develop. Successful service innovation was achieved by listening to customers and understanding the needs. Solomon and Michael (2014) considered that innovation aimed to enhance market competitiveness in order to understand customer needs, improve existing service model, and eventually achieve targeted revenue and profits. Gremyr et al. (2014) indicated that service innovation was essentially the new services offered by enterprises for customers, i.e. customers as a part of service innovation. The major difference in service innovation between service innovation and traditional operation innovation did not simply involve in enterprises.

Referring to the most representative “three dimensions of service innovation” proposed by Ho and Ganesan (2013) for measuring enterprises’ competitiveness, the model analyzes various patterns of service innovation.

1. Service concept: Service innovation could be delivered to customers through various tangible and intangible services, which were apparent (e.g. holiday banks) but often intangible and abstract, and a feeling or special agreement (e.g. concepts, ideas, and problem-solving methods).

2. Customer interface: Customer interface refers to transforming marketing processes into the interaction of continuous dialogues with customers to rapidly respond to customer needs, present tight connection with customers in the information exchange and interaction processes, and further enhance the relationship between enterprises and customers.

3. Service delivery: Intangible output of service should be delivered to customers through delicate service delivery system design.

Statistics Education

Rosell, Lakemond, and Wasti (2014) mentioned that a modern person, in the information explosion society, should present the capability of “sorting and compressing large amount of information into simple and understandable patterns”. Among various data arrangement methods, “statistics” was simple and convenient. Statistics explained the essence of various social or natural phenomena through described data which were organized and analyzed for understanding the meaning. The statistical process contains four points of data collection, data organization and analysis, data characterization, and data explanation. Aziz and Omar (2013)
indicated that statistics education aimed to find out the information implied in data through analyses and organization to explain certain phenomenon or make prediction. Trigo (2013) mentioned that a complete statistics teaching should contain dynamic activity for students’ participation to develop the required insight or enhance the level of understanding from data collection. In this case, the curriculum design of statistics was a series of processes dealing with a real problem, including problem formation, data collection, and data sorting, calculation, presentation, and explanation. Batnasan (2014) described that statistics education was used for dealing with data, which were composed of numbers; but, it was not simply numbers, but numbers with contents. In this case, statistics found out information from data and make conclusions. Farias, Aguiar, and Melo (2014) indicated that current curriculum design of statistics education, i.e. data analysis process at various stages, contained the important processes of (1) observing the characteristics of all types of data, (2) integrating and calculating data, and (3) analyzing, presenting, and explaining data results. Stickdorn and Schneider (2013) considered that teaching activity of statistics education covered data collection, organization, analysis, presentation, and explanation, aiming to achieve the following points. (1) Selecting suitable data collection model, according to the classification of problems and data, to solve problems. (2) Cultivating the basic critical thinking habit and capability in the data analysis process. (3) Developing the capability of interpreting and producing charts and tables with distinct representation for communication. (4) Comprehending and grasping the meaning of information.

Referring to Kang and Kang (2014), the statistical literacy model contains knowledge elements and dispositional elements

(1) Knowledge elements include elements of literacy skills, statistical knowledge, mathematical knowledge, context knowledge, and critical questions.

(2) Dispositional elements cover two elements of beliefs & attitudes and critical stance

**Customer Satisfaction**

The research of Jeong, Jang, Day, and Ha (2014) on consumer satisfaction induced successive researchers' definitions of customer satisfaction. Cardozo applied satisfaction to consumers and marketing and indicated that customer satisfaction would enhance the repurchase behavior of customers and the purchase of other products. Salunke, Weerawardena, and McColl-Kennedy (2013) considered that consumer satisfaction was resulted from the degree of delight or disappointment after comparing the expected product before purchase and the perceived product functions and characteristics after purchase. When the product functions and characteristics were not as expected, consumers would be dissatisfied; while they would be satisfied when the functions and characteristics exceeded the expectation. Batnasan (2014) explained customer satisfaction as customers’ overall attitudes after consumption to reflect the degree of like or dislike. Kindström, Kowalkowski, and Sandberg (2013) pointed out the factors in customer satisfaction as customer being satisfied with products or services reaching the demanded and expected evaluation, which would be affected by the characteristics and quality of specific products or services in which personal and situational factors were also mixed. Grimaldi, Quinto, and Rippa (2013) pointed out customer satisfaction as the relative judgment which took customers' acquisition and benefits from the purchase as well as the costs and efforts for the purchase into account. Tsai and Hsu (2014) mentioned that customer satisfaction was caused by the comparison between customers’ pre-expectation of products or services through past purchase experiences and the current purchase experience. Zhang and Wu (2013) regarded it as the attitude formed after the consumption process and the evaluation after purchasing products or receiving services to reflect the degree of customers’ like and dislike about the consumption. Gomez and Ballard (2013) explained it as the comparison between customers’ pre-expectation of products or services through past purchase experiences and the current purchase experience.

Referring to Tang (2013), customer satisfaction is divided into

(1) Employee evaluation: Customers’ satisfaction with the direct service staff, including professional knowledge and friendliness.

(2) Merchandise valuation: Customer satisfaction with products, containing availability and freshness.

**Research Hypothesis**

Taking consumers with purchase experiences in retail service industry as the research object, Yan, Wang, and Chau (2013) discussed the effect of service innovation drive and innovation patterns on performance. From the viewpoint of service dominant logic, the analysis results revealed that the mediation effect of “incremental innovation” could more easily highlight the relationship between “service innovation drive and service quality” as well as between “service innovation drive and customer satisfaction”. Domenico, Francis, and Daniela (2014) explained service innovation as the innovation of service providers through service concepts or principles, the innovation of customer interface, the innovation of customer interface service delivery process and technology
selection, or the provision of better solutions for customers, as well as the enhancement of added value to exceed the expected experience and perception, and the constant promotion of innovation contents and value of services and products to increase customers’ profits and satisfaction. Nanda, Kuruvilla, and Murty (2013) proposed that the role of service innovation was to ensure customer satisfaction and customer loyalty. Generally speaking, stores with higher customer satisfaction presented higher service innovation index, as the enhancement of income and consumption taste would receive customers’ agreement and satisfaction (Gremyr et al., 2014). Soloman (2014) studied a famous five-star hotel in Taiwan and found out the significantly positive effect of service innovation on customer satisfaction, where new service innovation and new service effectiveness were the remarkable factors in the promotion of customer satisfaction. The following hypothesis is therefore proposed in this study.

H1: Service innovation shows significant correlations with customer satisfaction.

Yaşlıoğlu, Çalışkan, and Şap (2013) mentioned that the so-called service innovation should begin with customer needs; better expected products and services could be created merely when customers were understood and even the customers of customers were understood. Batnasan (2014) proposed that enterprises had to collect and analyze the data of demographic data and behaviors of consumers and potential customers through information technology to establish the customer database. Under long-term tracking, the database system could record the transaction information between enterprises and customers and enterprises could acquire customer needs through the database to improve the provided products or services so as to enhance the relationship between enterprises and customers. Grönroos and Voima (2013) indicated that service innovation should particularly stress on digging out the needs of targeted groups, as, without accurately grasping needs, the planning and design of following service process and service combination would deviate to result in service mistake and be hard to create customer value. Kang and Kang (2014) mentioned that there were beneficial tools for enterprises digging out customer needs, such as online click rate of products, data mining, membership keyword searching, and Factor Analysis. After finding out customer preference, enterprises could develop new service combination, aiming at customer needs, for the analysis with statistical tools and had to comprehend and grasp the meaning after the analysis. Employees’ statistics education was therefore necessary to enhance the comprehension and analysis capabilities so as to accurately grasp the direction of service innovation. The following hypothesis is therefore established in this study.

H2: Statistics education reveals remarkable correlations with service innovation.

Zhang and Wu (2013) proposed that, to be active, enterprises had to regularly and irregularly survey customer satisfaction to understand the constantly changing customer needs and expectation and continuously improve products and product provision processes to be customer-centered. Heyne, Boettke, and Prychitko (2013) mentioned that customer satisfaction was used for measuring the degree of an enterprise or an industry satisfying or exceeding customer expectation of the purchased products. The customer satisfaction measuring process was the survey of customer satisfaction to find out key factors in customer satisfaction or dissatisfaction (it was sometimes called performance indicators when reflecting with statistical indicators). The statistical data were measured according to customers’ opinions about such factors to further acquire the comprehensive customer satisfaction indicator. Tang (2013) indicated that the survey of customer satisfaction was essentially the process of quantitative analysis, i.e. reflecting customer attitudes towards the measured object with figures. In this case, it was necessary to precede quantitative analysis of the survey indicator. Yu et al. (2013) argued that an enterprise proceeding customer satisfaction survey was not simply for a comprehensive statistical indicator, but to find out key factors in customer satisfaction through statistical analyses in order to make effective customer satisfaction strategies in the process of enhancing customer satisfaction. Apparently, enterprises have to precede statistics education for employees comprehending and analyzing the survey result of customer satisfaction so as to definitely find out the direct key factors in customer satisfaction or dissatisfaction. Accordingly, the following hypothesis is proposed in this study.

H3: Statistics education presents notable correlations with customer satisfaction.

EMPIRICAL RESEARCH DESIGN

Research Object

Employees of Qianjiangyue Leisure Farm, as the research object, are distributed 330 copies of questionnaire. Total 278 valid copies are retrieved, with the retrieval rate 84%. Qianjiangyue Leisure Farm, a multi-functional agricultural park, with natural experience, tourism and recreation, and popular science education, is one of the earliest developed leisure farms as well as a mature recreational agricultural touring spot. The farm is equipped 5 ecological mountains and ponds, 2 streams, arable, forest, lawn, slope, reservoir, and streams. The stereoscopic climate in the farm is obvious with large temperature difference between day and night, outstanding biodiversity, and rich animal and plant species. There is a tourist service center in the farm, as well as areas of natural lawn, agricultural experience, popular science education, agricultural landscape, ecological barbecue, and green life. It
presents the advantage of good resources when creating the agricultural production experience environment and constructing waterscape, geographic landscape, and biological landscape.

Analysis Method

Regression Analysis is applied to understand the relationship among service innovation, statistics education, and customer satisfaction.

ANALYSIS RESULT

Reliability and Validity Analysis

The statistical education problems in this study are calculated with Likert 5-point scale. With Factor Analysis, two factors of “knowledge aspect” (eigenvalue=1.835, α=0.80) and “affection aspect” (eigenvalue=1.627, α=0.82) are extracted. The accumulative covariance explained achieves 74.663%.

The service innovation problems in this study are measured with Likert 5-point scale. Three factors of “service concept” (eigenvalue=2.577, α=0.88), “customer interface” (eigenvalue=2.218, α=0.85), and “service delivery” (eigenvalue=1.732, α=0.81) are extracted with Factor Analysis. The accumulative covariance explained reaches 78.236%.

The customer satisfaction problems are measured with Likert 5-point scale. With Factor Analysis, two factors of “staff evaluation” (eigenvalue=3.166, α=0.89) and “merchandise valuation” (eigenvalue=3.021, α=0.90) are extracted. The accumulative covariance explained achieves 82.743%.

Correlation Analysis of Statistical Education and Service Innovation

Regression Analysis is applied in this study to test the hypotheses and the theoretical structure. The first regression tests the effect of statistical education on service concept. The results reveal positive effects of knowledge aspect and affection aspect on service concept (Beta=0.216, p=0.005; Beta=0.231, p=0.001; Beta=0.187, p=0.013). The second regression tests the effect of statistical education on customer interface. The results show positive and significant effects of knowledge aspect and affection aspect on customer interface (Beta=0.211, p=0.007; Beta=0.228, p=0.003). The third regression tests the effect of statistical education on service delivery. The results present positive and remarkable effects of knowledge aspect and affection aspect on service delivery (Beta=0.187, p=0.013; Beta=0.243, p=0.000) (Table 1). Accordingly, H2: statistical education shows notable correlations with service innovation is supported.

Correlation Analysis of Service Innovation and Customer Satisfaction

Regression Analysis is utilized for testing the hypothesis and the theoretical structure. The first regression tests the effect of service innovation on staff evaluation, revealing positive effects of service concept, customer interface, and service delivery on staff evaluation (Beta=0.211, p=0.006; Beta=0.203, p=0.008; Beta=0.231, p=0.001). The second regression tests the effect of service innovation on merchandise valuation showing positive and significant effects of service concept, customer interface, and service delivery on merchandise valuation (Beta=0.189, p=0.011; Beta=0.214, p=0.004; Beta=0.226, p=0.002) (Table 2). H1: service innovation presents remarkable correlations with customer satisfaction is therefore supported.

| Table 1. Analysis of statistical education to service innovation |
|----------------------|---------------|---------------|---------------|
| dependent variable -- | service concept | service innovation | service delivery |
| independent variable | Beta | P | Beta | P | Beta | P |
| statistical education | | | | | | |
| knowledge aspect | 0.216** | 0.005 | 0.231** | 0.001 | 0.187* | 0.013 |
| affection aspect | 0.211** | 0.007 | 0.228** | 0.003 | 0.243*** | 0.000 |
| F | 18.521 | 23.442 | 29.168 |
| significance | 0.000*** | 0.000*** | 0.000*** |
| R2 | 0.173 | 0.212 | 0.269 |
| adjusted R2 | 0.156 | 0.178 | 0.245 |

Note: * stands for p<0.05, ** for p<0.01, *** for p<0.001.
Data source: Self-organized in this study
Correlation Analysis of Statistical Education and Customer Satisfaction

Regression Analysis is used in this study for testing the hypothesis and the theoretical structure. The first regression tests the effect of statistical education on staff evaluation, revealing positive effects of knowledge aspect and affection aspect on staff evaluation (Beta = 0.227, p = 0.002; Beta = 0.237, p = 0.001). The second regression tests the effect of statistical education on merchandise valuation, showing positive and notable effects of knowledge aspect and affection aspect on merchandise valuation (Beta = 0.241, p = 0.000; Beta = 0.218, p = 0.003) (Table 3). Apparently, H3: statistical education shows remarkable correlations with customer satisfaction is supported.

CONCLUSION

Increasing domestic and international emphases on service innovation in past years and factors of globalization, changing lifestyles, and the transfer of industrial focus have indirectly created business opportunities for leisure farms. However, in order to attract more customers to surpass competitors, the cultivated service innovation capability must present the uniqueness and be able to match customer needs. From the research results, leisure farms mainly provide services for customers that it is the labor-intensive industry. In this case, service staff becomes the frontline object to contact customers. In addition to certain professional knowledge and skills, service staff service attitudes are the core of customer service. Nevertheless, products and services offered by any industries require constant progress and follow the step and needs of the world. In addition to make efforts for customer needs and habits, leisure farms have to constantly and positively search for methods to provide customers value. "Continuously looking for methods to provide value" is the only way to satisfy customers and enhance profits. When leisure farms promote the products or services with service innovation, the “use difficulty” should be taken into account. No matter how good services or products are provided by leisure farms, it would be a pity when customers do not know how to use them. For this reason, an easy-operation interface allows customers easily enjoying the services or products provided by businesses and could change and attract new customers who are not appealed by traditional methods. Leisure farms therefore have to reinforce employees’ statistics education in order to correctly dig out customer value and services or products, which customers really need, in the huge marketing survey data to enhance leisure farms' competitiveness.

SUGGESTION

Aiming at above research results, the following suggestions are proposed in this study.
1. Leisure farms are suggested to stress on service staff’s attitudes, rather than stopping investing resources in service staff’s statistics education and professional training. Moreover, service staff’s behaviors, service attitudes, and knowledge & skills should be well trained to effectively enhance the quality and have customers be better satisfied with the serviced offered. The sensitivity to statistical data should be reinforced in the statistics education so that leisure farms do not simply acquire the comprehensive statistical index, but discover key factors in customer satisfaction through statistical analyses in order to enhance customer satisfaction.

2. Products and services offered by leisure farms are easily imitated by others in the same industry, as it is transparent and cannot be regulated with patents. Leisure farms therefore have to attract customers with diverse equipment and services. In this case, the development of new products and services with “delicate package” becomes critical. Leisure farms are suggested to constantly come out with rich and delicate product and service packages, i.e. reinforcing product use, function, or aesthetic appearance, as well as provide various service combinations to enhance the width and depth of services and have customers appear satisfaction and loyalty to leisure farms.

3. To understand customer satisfaction with leisure farms, some businesses would request customers filling in satisfaction survey or directly inquire customer’s satisfaction to acquire customers’ true needs through statistical data. Businesses are suggested to contact customers with positive methods, such as inquiring customers’ consumption orientation by phones, surveying satisfaction with questionnaire, or directly asking customer needs, to realize customer needs as well as to have customers understand the efforts made by the businesses. It would provide customers with different perception from the past.

ACKNOWLEDGEMENTS

Funding project support by No: 612014020, “Beautiful Village”, the building innovative experimental zone, Fujian high-level university construction projects.

REFERENCES

Batnasan, J. (2014). Exploring relationships among service innovations, customer satisfaction and customer value in airport (Masters Thesis). Asia University, Department of Business Administration, Taiwan.


Stickdorn, M., & Schneider, J. (2013). This is service design thinking: Basics, tools, cases. New Jersey: Wiley.


http://www.ejmste.com