

The Relationships among the Service Quality of Fire Security Inspection and People's Satisfaction —A Study on Elder Care Facilities

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Abstract

This study examines the relationships between fire safety inspection and quality of service in hopes of better achieving the goal of protecting people's lives and property. Study samples are collected from owners and fire protection managers of elder care facilities around Taiwan. In total, 419 questionnaires were distributed, and 334 were answered and collected. The study applies structural equation model (SEM) and is analyzed by Amos version 18.0.

The study results indicate that the quality of service of fire safety inspection has a direct influence over how people are satisfied with the service, and the direct influence is exerted through the quality of relationships; inspectors' characteristics have a direct influence over the satisfaction rate through the quality of relationships; the images of fire departments also have direct impacts over how people perceive the service. Key factors that have the most influence over how people are happy with the service are, in order of their degree of influence: the service quality of fire safety inspection, images of the fire departments, and the inspectors' characteristics. In addition, after evaluating the overall model, a positive and fair result is shown in applying SEM to retrieve the service satisfaction rate by examining quality of service of fire safety inspection, inspectors' characteristics, images of fire departments, and quality of relationships; also, SEM can be used to interpret data, the results of which can serve as reference for the fire departments in the future in formulating safety inspection policies.

Keywords: structural equation model (SEM), quality of service of fire safety inspection, images of fire departments, service satisfaction, elder care facilities.

1. Introduction

Fire departments has always worked hard on fire safety inspections for public spaces because they directly concern the safety of consumers. Fire safety inspectors interact very frequently with the public and also notably influence how the public regard services provided by the public sector. However, with the major disasters in recent years, the public often exhibited low satisfaction with fire safety inspection services. For instance, the fire at National Taiwan University Hospital resulted in one death and attracted much public attention¹. In 2012, fire struck the nursing home of Beimen Branch of Sinying Hospital, resulting in a major incident that left 13 dead and 59 injured². On October 11, 2013, the fire at a hospital in Fukuoka, Japan killed 10 and left seven injured. At 5:05 a. m. on March 10, 2017, Ai Shin Long-term Care Center in Taoyuan City caught fire. Although the fire department extinguished the fire within 30 minutes, four had lost vital signs before reaching the hospital and were pronounced dead. Another nine were injured and hospitalized. The many fires at nursing homes remind the aging society in Taiwan that living spaces for the elderly are at risk. In addition to demanding public attention on the safety at nursing homes, these incidents also generate concern from international media about the high approval rate of fire safety inspections by the fire department and occurrences of major disasters. Dissatisfaction, and even distrust, are growing in the public with the fire safety inspection services by the fire department.

To enhance national competitiveness, the Taiwanese government has implemented the “re-engineering government” movement, drawing inspiration from business administration for reinventing governmental organizations and functions, so that public services can continuously improve, achieve government performance objectives to garner public support, strive to provide

comprehensive services that center around public needs, and minimize the gap between public expectations and perceived results. Local governments have also been encouraged to provide public-oriented services and use service satisfaction as a performance indicator for governance to become innovative, flexible governments. Grönroos (1984)³ believed that quality of service was the result of consumer expectation on the service compared with perception of the service after it was rendered. Therefore, this study applied customer-oriented emphasis on quality of service on the guidelines for safety inspections by the fire department. This study aims to investigate the correlation between quality of service of fire safety inspections and the difference between public expectation and perception in an attempt to understand the level of satisfaction of the public with the fire department. Moreover, elder care facilities house mostly those with difficulty escaping from disasters, and fires at such places often trigger public outcry. Therefore, this study also surveyed elder care facilities in Taiwan from the perspective of government service attitude and quality combined with expertise in fire safety inspections performed by firefighters.

2. Theoretical background

2.1 Theoretical analysis on service quality

Total quality management (TQM) consists of three basic principles first, customer focus, which ensures customers perceive value and satisfaction; second, universal participation, which ensures the participation and collaboration of stakeholders; and third, continual improvement, which ensures persistent review and correction⁴. Parasuraman et al.

¹ SINA.com (2013, September 8). Retrieved from <http://news.sina.com.tw/focusreport/society/726.html>.

² Control Yuan (2013, October 15). Retrieved from http://www.cy.gov.tw/sp.asp?xdURL=../di/edoc/db2.asp&edoc_no=2&ctNode=911.

³ C. Grönroos, “A service quality model and its marketing implications,” *European Journal of Marketing*, vol. 18, no. 4, pp. 36-44, April 1984.

⁴ J. R. Evans, and W. M. Lindsay, *The Management and Control of Quality*, 6th ed., South-Western College Pub., 2004, pp.77.

(1985)⁵ and Parasuraman et al. (1988)⁶ believed that service quality is an abstract internal perception, and that the perception of the service rendered is equal to or larger than the perception of the service expected. Sasser et al. (1978)⁷, Parasuraman et al. (1985), Parasuraman et al. (1988), Al-hawari (2008)⁸, Hu and Bentler (2009)⁹, and Chou (2003)¹⁰ proposed many dimensions of service quality. After consideration, the model by Parasuraman et al. (1988), with variables of assurance, responsiveness, tangibility, empathy, and reliability, was selected for the fire safety inspection service quality measurement in this study. The service quality dimensions of people, service, and information proposed by Chou (2003) were adapted as safety inspector quality, safety inspector attitude, and supply of inspection results for this study. Continual improvement in quality management was adapted as control of spaces of violation. Finally, based on empirical research, owner autonomous management was included as a dimension in the measurement of safety inspection quality management.

2.2 Theoretical analysis on image of fire departments

Boulding (1956)¹¹, Worcester (1972)¹², Oxenfeldt (1974)¹³ proposed that the image is a kind of subjective perception, and here it refers to the overall impression on a customer. Walters (1978)¹⁴, Gray and Balmer (1998)¹⁵, and Nguyen and Leblanc (2001)¹⁶ believed that a corporate image was built on the impression of consumers on factors including corporate policies and service. Pope et al. (2004)¹⁷ and Tang (2007)¹⁸ pointed out that a corporate image was the overall opinion of the public on specific organizations. Based on the above, this study applied the concept of corporate image to the image of a government agency, in the sense that the image of an agency comes from the public's overall perception and impression based on people's existing information and thoughts. Therefore, this image is based on the subjective perception of the public, which does not necessarily reflect the reality of the agency. Fire departments protect the safety of the lives and property of members of the public in accordance with the Fire Services Act. Therefore, when performing safety inspections, the concept of corporate image can be applied, as they enforce laws and regulations, implement fire protection education,

⁵ A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "A conceptual model of service quality and its implication for future research," *Journal of Marketing*, vol. 49, no. 4, pp. 41-50, September 1985.

⁶ A. Parasuraman, L. Berry, and V. Zeithaml, "Servqual: A multiple-item scale for measuring customer perceptions of service quality," *Journal of Retailing*, vol. 64, no. 1, pp. 12-40, January 1988.

⁷ W. E. Sasser, R. P. Olsen, and D. D. Wyckoff, *Management of service operations: text and cases*, Boston: Allyn and Bacon, 1978.

⁸ M. Al-hawari, "The influence of traditional service quality factors on customer satisfaction: a practical study within the context of Australian banking," *The Business Review*, Cambridge, vol. 11, no. 2, pp. 114-119, December 2008.

⁹ L. Hu, and P. M. Bentler, "Cutoff criteria for fit index in covariance structural Equation Modeling," *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 6, no. 1, pp. 1-55, November 2009.

¹⁰ W. S. Chou, "Management for Service Industry," *National Open University*, 2003, pp. 128.

¹¹ K. E. Boulding, *The image*, Michigan: University of Michigan Press, 1956.

¹² R. M. Worcester, *Consumer market research handbook*, New York: McGraw-Hill Book Company, 1972.

¹³ A. Oxenfeldt, "Developing a favorable price-quality image," *Journal of Retailing*, vol. 50, no. 4, pp.8-14, 1974.

¹⁴ C. G. Walters, *Consumer behavior: An integrated framework*, New York: Richard, D. Irwin Inc., 1978.

¹⁵ E. R. Gray, and J. M. T. Balmer, "Managing corporate image and corporate reputation," *Long Range Planning*, vol. 31, no. 5, pp. 695-702, October 1998.

¹⁶ N. O. Nguyen, and G. Leblanc, "Corporate image and corporate reputation in customer's retention decision in services," *Journal of Retailing and Consumer Services*, vol. 8, no. 4, pp. 227-236, July 2001.

¹⁷ N. K. L. Pope, K. E. Voges, and M. R. Brown, "The effect of provocation in the form of mild erotica on attitude to the AD and corporate image: Differences between cause-related and product based advertising," *Journal of Advertising*, vol. 33, no. 1, pp.69-82, March 2004.

¹⁸ W. Tang, "Impact of corporate image and corporate reputation on customer loyalty: A review," *Management Science and Engineering*, vol. 1, no. 2, pp. 57-62, December 2007.

ensure the safety of lives and property, and enhance their image in the public. When mistakes happen with fire safety inspections, public safety risks and renovation costs are involved, and the reputation of fire departments is at stake. Based on Walters (1978), Keller (2000)¹⁹, Flavián et al. (2005)²⁰, Mathieu and Zajac (1990)²¹, and Burmann et al. (2008)²², combined with the service-like attributes of fire safety inspections, this study included the variables of functional image and reputation as dimensions of the image of fire departments.

2.3 Theoretical analysis on relationship quality

The term relationship quality came from relationship marketing. Levitt (1983)²³, Crosby et al. (1990)²⁴, Smith (1998)²⁵, Anderson and Gerbing (1988)²⁶, Garbarino and Johnson (1999)²⁷, and

Tellefsen and Thomas (2005)²⁸ believed that a prerequisite for establishing a relationship between a corporation and customers was mutual trust and commitment. This study applied relationship quality to how the public can trust the results of fire safety inspections, how uncertainty felt by the public can be decreased, how regulatory ambiguity and safety concerns can be thoroughly explained to the public, how positive interactions can be established, and how a positive image of fire departments can be maintained. This study included factors of commitment and trust as dimensions in measuring relationship quality based on variables proposed in the relationship quality structure by Morgan and Hunt (1994)²⁹, Gundlach et al. (1995)³⁰, and Pierre et al. (2010)³¹.

2.4 Literature analysis on satisfaction theory

The Howard and Sheth (1967)³² first applied satisfaction to consumer theory. Later researchers applied the concept in subjects including work satisfaction, service satisfaction, and health care satisfaction. Day (1977)³³, Pfaff (1977)³⁴, Oliver

¹⁹ K. L. Keller, *Building and Managing of Corporate Brand Equity*, London: Oxford University Press, 2000.

²⁰ C. Flavián, M. Guinalú, and E. Torres, "The influence of corporate image on consumer trust: A comparative analysis in traditional versus internet banking," *Internet Research*, vol. 15, no. 4, pp. 447-470, September 2005.

²¹ J. Mathieu, and D. Zajac, "A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment," *Psychological Bulletin*, vol. 108, no. 2, pp. 171-194, September 1990.

²² C. Burmann, K. Schaefer, and F. Maloney, "Industry image: its impact on the brand image of potential employees," *Journal of Brand Management*, vol. 15, no. 3, pp. 157-176, September 2008.

²³ T. Levitt, "Production-line approach to service," *Harvard Business Review*, vol. 50, no. 2, pp. 41-52, 1983.

²⁴ L. A. Crosby, K. R. Evans, and D. Cowles, "Relationship quality in services selling: An interpersonal influence perspective," *Journal of Marketing*, vol. 54, no. 3, pp. 68-81, July 1990.

²⁵ J. B. Smith, "Buyer, seller relationships: similarity, relationship management and quality," *Psychology and Marketing*, vol. 15, no. 1, pp. 3-21, December 1998.

²⁶ J. C. Anderson, and D. W. Gerbing, "Structural equation modeling in practice: A review and recommended two-step approach," *Psychological Bulletin*, vol. 103, no. 3, pp. 411-423, May 1988.

²⁷ E. Garbarino, and M. S. Johnson, "The different roles of satisfaction, trust and commitment in customer relationships," *Journal of Marketing*, vol. 63, no. 2, pp. 70-87, April 1999.

²⁸ T. Tellefsen, and G. P. Thomas, "The antecedents and consequences of organizational and personal commitment in business service relationships," *Industrial Marketing Management*, pp. 23-37, January 2005.

²⁹ R. M. Morgan, and S. D. Hunt, "The commitment-trust theory of relationship marketing," *Journal of Marketing*, vol. 58, no. 3, pp. 20-38, July 1994.

³⁰ G. T. Gundlach, S. R. Achrol, and T. J. Mentzer, "The structure of commitment in exchange," *Journal of Marketing*, vol. 59, no. 1, pp. 78-92, January 1995.

³¹ C. Pierre, T. S. Dagger, and O. Don, "Service quality, trust, commitment and service differentiation in business relationships," *Journal of Services Marketing*, vol. 24, no. 5, pp. 336-346, August 2010.

³² J. A. Howard, and J. N. Sheth, *The theory of buyer behavior*, New York: John Wiley and Sons, 1967.

³³ R. L. Day, "Extending the concept of consumer satisfaction," *Atlanta: Association for Customer Research*, vol. 4, no. 1, pp. 149-154, 1977.

³⁴ M. Pfaff, "The index of consumer satisfaction measurement problem and opportunity," *The conceptualization of consumer satisfaction and dissatisfaction*, In H. Keith Hunt (Eds.), UK. Cambridge: Marketing Science Institute, 1977.

(1980)³⁵, and Churchill and Suprenant (1982)³⁶ believed that satisfaction was a mental state in which the expectation matched the actual experience. Singh (1990)³⁷ discovered that satisfaction is a concept that consists of multiple factors and believed that measurements of satisfaction vary over different industries and research subjects. Fornell (1992)³⁸ believed that customer satisfaction consisted of the overall opinion of customers on the products and services supplied by a company. Anderson et al. (1994)³⁹ also believed that overall customer satisfaction was the entirety of processes and experiences in purchases and rendered services, accumulated over time as a construct. Spreng et al. (1996)⁴⁰ believed that overall customer satisfaction was the emotional state of customers after using a product or a service and should include the concept of service. Parker and Mathews (2001)⁴¹ believed that customer satisfaction has become an important indicator in the management of today's businesses, and governments are actively incorporating concepts from business administration to provide public-oriented services. In the scope of this study, service satisfaction is the level of consistency between expectations and actual experiences regarding fire safety inspections. It can be used as a criterion for measuring the service quality of fire safety inspection services rendered by fire departments. This study considered operational definitions and attributes of fire safety inspection services proposed by Pan

(2007)⁴², Hsu and Hsu (2008)⁴³, and Hu (2011)⁴⁴ and decided upon four criteria- satisfaction with individual fire department member, overall satisfaction, expertise, and interaction with fire department members for measuring service satisfaction, based on Pan (2007) and Hu (2011).

2.5 Research design

The structure of this study is based on the relationship model established by Olson and Paul (1987)⁴⁵, where corporate image directly influenced customer trust, and the intervening variable of customer satisfaction had direct influence on customer trust. In addition, this study investigated the relationship between quality management and customer satisfaction based on Zeithaml and Bitner (1996)⁴⁶. Lastly, quality management in this study is based on the relationship between satisfaction and confidence in Caruana (2002)⁴⁷. Based on the fire safety literature above, the research framework was established as shown in Fig. 2-1.

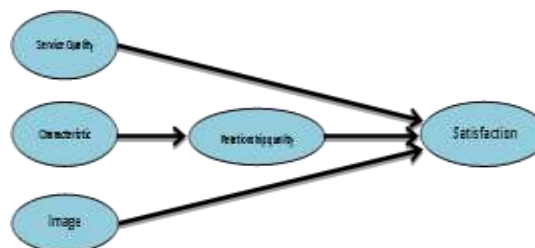


Figure 2-1. Research framework.

³⁵ R. L. Oliver, "A cognitive model of the antecedents and consequences of satisfaction decisions," *Journal of Marketing Research*, vol. 17, no. 4, pp. 460-469, November 1980.
³⁶ G. A. Churchill, and C. Surprenant, "An investigation into the determinants of customer satisfaction," *Journal of Marketing Research*, vol. 19, no. 4, pp.491-504, November 1982.
³⁷ J. Singh, "Voice, exit, and negative word of mouth behavior: an investigation across three service categories," *Journal of the Academy of Marketing Science*, vol. 18, no. 1, pp. 1-15, December 1990.
³⁸ C. Fornell, "A national customer satisfaction barometer: the Swedish experience," *Journal of Marketing*, vol. 56, no. 1, pp.1-18, January 1992.
³⁹ E. W. Anderson, C. Fornell, and D. R. Lehman, "Customer satisfaction, market share, and profitability: findings from Sweden," *Journal of Marketing*, vol. 58, no. 3, pp. 53-66, July 1994.
⁴⁰ R. A. Spreng, S. B. MacKenzie, and R. W. Olshavsky, "A reexamination of the determinants of customer satisfaction," *Journal of Marketing*, vol. 60, no. 3, pp.15-32, July 1996.
⁴¹ C. Parker, and B. P. Mathews, "Marketing intelligence and planning," *Bradford*, vol. 19, no. 1, pp.38-40, 2001.

⁴² P. T. Pan, "A study on service quality and customer satisfaction in table tennis club in Taipei," *National Taiwan Normal University*, 2007, pp. 47- 48.
⁴³ J. C. J. Hsu, and C. M. Hsu, "The relationships between service quality and customer satisfaction in a leading Chinese web 2.0 company," *The Business Review*, Cambridge, vol. 11, no. 1, pp. 84-89, 2008.
⁴⁴ H. Y. Hu, "Relationships amongst patient satisfaction, relationship inertia, and loyalty in nephrology dialysis patients," *The Journal of Health Science*, Taipei, vol. 13, no. 2, pp. 89-100, 2011.
⁴⁵ J. C. Olson, and P. J. Paul, *Consumer Behavior: Marketing Strategy Perspectives*, New York: Richard, D. Irwin, Inc., 1987, pp. 312-314.
⁴⁶ V. A. Zeithaml, and M. J. Bitner, *Service Marketing*, NY: Hill, McGraw, 1996, pp. 128.
⁴⁷ A. Caruana, "Service loyalty: the effects of service quality and the mediating role of customer satisfaction," *European Journal of Marketing*, vol. 36, no. 7/8, pp. 811-828, August 2002.

Inferred from the research framework, theories, and literature, the four sub-dimensions of elder care facility fire safety inspection services have positive influence on service satisfaction, assuming the following:

(H1) means service quality of safety inspectors has positive influence on service satisfaction

(H2) means characteristics of safety inspectors have positive influence on service satisfaction

(H3) means image of fire departments has positive influence on service satisfaction

(H4) means relationship quality of safety inspectors has positive influence on service satisfaction

3. Research methods

3.1 Measures and analysis methods

Structural equation model (SEM) is a kind of multivariate statistics. However, many structural equation models in the management disciplines are specified as fully reflective (Rigdon, 2012⁴⁸; Hair et al., 2012a⁴⁹; Hair et al., 2012b⁵⁰) with all manifest variables as endogenous and only latent variables as exogenous. Hence, no manifest predictors exist from which values for new cases can be predicted (Evermann & Tate, 2014)⁵¹. The original concept of

SEM proposed by Jöreskog (1973)⁵², Bentler (1983)⁵³, Anderson and Gerbing (1988)⁵⁴ included two major elements measurement model and structure model. The measurement model reflects the relationship between observed variables and latent variables, and the structure model allows the relationship between latent variables to be investigated using path analysis. After establishing the research framework and estimating all parameters, the models can be evaluated using goodness of fit index. If the results of goodness of fit index are not ideal, problems may lie with parameter calculations or framework design. Therefore, the models or parameters should be modified, so that goodness of fit index fall in the ideal range. The following are common goodness of fit indexes.

(1) Chi-square degree of freedom (χ^2/df)

Also known as normed chi-square, it is used to compare goodness of fit between models. The smaller the value, the better the fit, and the larger the value, the worse the fit. Generally, a model has an ideal goodness of fit when chi-square degree of freedom is smaller than 2 or 3⁵⁵.

(2) Goodness of fit index (GFI)

GFI resembles the explainable variance (R^2)⁵⁶ in regression analysis and represents the ratio of variance to covariance in the observation data in a model. Because the derived value of a model is smaller than the observed value, GFI is smaller than 1. A GFI closer to 1 indicates a higher GFI of the

⁴⁸ E. E. Rigdon, "Rethinking partial least squares path modeling: In praise of simple methods," *Long Range Planning*, vol. 45, no. 5-6, pp. 341-358, October 2012.

⁴⁹ J. Hair, M. Sarstedt, T. Pieper, and C. Ringle, "The use of partial least squares structural equation modeling in strategic management research: A review of past practices and recommendations for future applications," *Long Range Planning*, vol. 45, no. 5-6, pp. 320-340, November 2012a.

⁵⁰ J. F. Hair, M. Sarstedt, C. Ringle, and J. Mena, "An assessment of the use of partial least squares structural equation modeling in marketing research," *Journal of the Academy of Marketing Science*, vol. 40, no. 3, pp. 414-433, March 2012b.

⁵¹ J. Evermann, and M. Tate, "Comparing out of sample predictive ability of PLS, covariance, and regression models," *Proceedings of the 35th international conference on information systems (ICIS)*, Auckland, New Zealand, 2014.

⁵² K. G. Jöreskog, "A General Method for Estimating a Linear Structural Equation System." In A. S. Goldberger & O. D. Duncan (Eds.), *Structural Equation Models in the Social Sciences*, New York: Seminar, 1973, pp. 85-112.

⁵³ P. M. Bentler, "Some contributions to efficient statistics in structural models: specification and estimation of moment structures," *Psychometrika*, vol. 48, no. 4, pp. 493-517, December 1983.

⁵⁴ J. C. Anderson, and D. W. Gerbing, "Structural equation modeling in practice: a review and recommended two-step approach," *Psychol Bull*, vol. 103, no. 3, pp. 411-423, May 1988.

⁵⁵ E. G. Carmines, and J. P. McIver, "Analyzing Models with Observable Variables," In G. W. Bohmstedt, & E. F. Borgatta, (Eds.), *Social Measurement: Current Issues*, pp. 65-115, 1981.

⁵⁶ J. S. Tanaka, and G. J. Huba, "A general coefficient of determination for covariance structure models under arbitrary GLS estimation," *British Journal of Mathematical and Statistical Psychology*, vol. 42, no. 2, pp. 233-239, November 1989.

model. Conversely, the smaller the value, the lower the GFI.

(3) Adjusted goodness of fit index (AGFI)

AGFI resembles the adjusted explainable variance (Adjusted R²) in regression analysis. It is the goodness of fit for the model that is derived from calculating GFI with degree of freedom included. The more parameters included, the larger the AGFI, and the closer it is to the ideal resulting goodness of fit. GFI and AGFI values are between 0 and 1, both having standardizing effects. The closer to 1, the better the goodness of fit, and the farther from 1, the worse. An ideal goodness of fit is generally considered to be above 0.90⁵⁷.

3.2 Survey design and sampling procedure

In Loehlin (1992)⁵⁸, it was recommended that studies involving SEM include at least 100 samples and ideally 200 samples. Schumacker and Lomax (2004)⁵⁹ believed that the sample size should be between 250 and 500 and that a sample size below

200 would lead to unreliable parameter estimation and lack statistical significance and power. In preliminary testing for this study, experts helped review the statistical process. Then the questionnaire was finalized after preliminary testing with 46 owners and fire safety managers from 30 elder care

facilities in Keelung City. For the survey, 419 questionnaires were issued, 334 were collected, and 66 were invalid, resulting in 268 valid questionnaires, with a validity rate of 64%, conforming to the sample size requirements above.

3.3 Response analysis survey

Descriptive statistical analysis revealed the following regarding the sample distribution among the subjects in elder care and long-term care facilities. With respect to gender, 148 were male (55.2%) and 120 were female (44.8%). With respect to position, 165 were fire safety managers (61.6%), 103 were and owners (38.4%). In terms of age groups, 103 were between 41 and 50 years of age (38.4%), which was the largest group, followed by 90 (33.6%) between 51 and 60 years of age. With respect to education, a plurality of 110 (41.0%) held junior college degrees, followed by 76 (28.4%) with college degrees, and 72 (26.9%) held high school degrees or lower.

In terms of type of facility, a majority of 235 (87.7%) were elder care facilities. In terms of nature of facility, a majority of 264 (98.5%) were privately owned. In terms of years since registration, a plurality of 93 (34.7%) had histories between 11 and 15 years, followed by 87 (32.5%) between 6 and 10 years, and 58 (21.6%) between 1 and 5 years. In terms of number of beds, a plurality of 83 (31.0%) had between 21 and 30 beds, followed by 66 (24.6%) with between 31 and 40 beds, and 51 (19.0%) with between 11 and 30 beds. See Table 3-1.

Table 3-2 shows the samples in this study compared with the numbers of elder care and long-term care facilities across Taiwan.

3.4 Statistical analysis

3.4.1. Offending estimates

In the statistical results, the research dimensions fire safety inspection service quality, fire safety inspector characteristics, image of fire departments, relationship quality, and service satisfaction- showed absolute form value within 2 and absolute kurtosis within 7, meaning that the data conformed to single-variant normal distribution. Therefore, the maximum likelihood method was used for model evaluation. Results showed that the measurement errors for all research dimensions were larger than 0, meaning that the direction was correct and error variance were all significant. No standardized parameters exceeded 1,

⁵⁷ L. Hu, and P. M. Bentler, "Cutoff Criteria for Fit Index in Covariance Structural Equation Modeling," *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 6, no. 1, pp.1-55, November 2009.

⁵⁸ J. C. Loehlin, *Latent variable models: An introduction to factor, path and structural analysis*, 2nd ed., Hillsdale, NJ: Lawrence Erlbaum, 1992.

⁵⁹ R. E. Schumacker, and R. G. Lomax, *A Beginner's Guide to Structural Equation Modeling*, 2nd ed., Mahwah, NJ: Lawrence Erlbaum Associates, 2004.

and no standardized coefficients were near 1, thus not violating offending estimates.

3.4.2. Reliability analysis

The second order (first order) confirmatory factor analysis, factor loadings, reliability, component reliability, validity, discriminant validity, residuals, regression coefficient, and average variance extracted of all research dimensions conform to standards after adjustments based on mass index.

3.4.3. Structural equation model

Conformity to the goodness of fit indexes of the hypothetical models. See Table 3-3.

The results of the assessment of the goodness of fit for the model in this study showed the level of conformity to the goodness of fit indexes of the hypothetical models

Table 3-1. Sample distribution.

Category	Sample No.	Percentage (%)	Cumulative percentage (%)
Gender			
Male	148	55.2	55.2
Female	120	44.8	100
Position			
Owner	103	38.4	38.4
Fire safety manager	165	61.6	100
Age			
30 to 40	61	22.8	22.8
41 to 50	103	38.4	61.2
51 to 60	90	33.6	94.8
61 and above	14	5.2	100
Education			
High school and below	72	26.9	26.9
Junior college	110	41.0	67.9
College	76	28.4	96.3
Master's or above	10	3.7	100
Type of facility			
Long-term care	7	2.6	2.6
Elder care	235	87.7	90.3
Nursing home	5	1.9	92.2
Other	21	7.8	100
Nature of facility			
State-owned	3	1.1	1.1
Private	264	98.5	99.6
Other	1	0.4	100
History (years)			
1 to 5	58	21.6	21.6

6 to 10	87	32.5	54.1
11 to 15	93	34.7	88.8
16 to 20	18	6.7	95.5
21 and above	12	4.5	100
Number of beds			
10 and below	9	3.4	3.4
11 to 20	51	19.0	22.4
21 to 30	83	31.0	53.4
31 to 40	66	24.6	78.0
41 to 50	40	14.9	92.9
51 and above	19	7.1	100

Table 3-2. Comparison of samples in this study and facilities across Taiwan.

	State-owned	private-run	State-run	Private	Total
Registered facilities in Taiwan	11		12	1001	1024
Samples in this study	1		3	264	268

Table 3-3. Summary of overall model GFI.

Overall GFI	Observed value	Goodness of fit standard	Evaluation of goodness of fit for model
Absolute GFI			
χ^2	121.530	As small as possible	--
GFI	0.931	≥ 0.90	Good
AGFI	0.881	≥ 0.90	Acceptable
SRMR	0.0331	≤ 0.05	Good
RMSEA	0.073	≤ 0.08	Good
Incremental GFI			
CFI	0.969	≥ 0.90	Good
Parsimonious GFI			
PCFI	0.661	≥ 0.50	Good

PNFI	0.649	≥ 0.50	Good
χ^2/df	2.701	1.0~5.0	Good

Empirical results showed that with the exception of the direct effect of fire safety inspection service quality on relationship quality, the direct effects of fire safety inspection service quality on service satisfaction, fire safety inspector characteristics on relationship quality, image of fire departments on service satisfaction, and relationship quality on service satisfaction achieved significance, meaning that latent variables were influential. Moreover, fire safety inspector characteristics had significant positive influence on public satisfaction through relationship quality, in line with theoretical prediction. Table 3-4 shows path and effectiveness analysis on the latent variables.

Table 3-4. Influence and hypothesis testing on the latent variables in the structure model.

Path of influence	Direct effectiveness	Indirect effectiveness	Overall effectiveness	Testing result
Fire safety inspection service quality →relationship quality	0.35	0	0.35	X
Fire safety inspection service quality →relationship quality→satisfaction	0.42	0.098	0.518	O
Fire safety inspector characteristics →relationship quality	0.45	0	0.45	O
Fire safety inspector characteristics→relationshipquality→satisfaction	0	0.126	0.126	O
Image of fire departments→satisfaction	0.22	0	0.22	O
Relationship quality→satisfaction	0.28	0	0.28	O

Note: * $p < .05$ ($|t| > 1.96$) ; ** $p < .01$ ($|t| > 2.58$) ; *** $p < .001$ ($|t| > 3.29$)

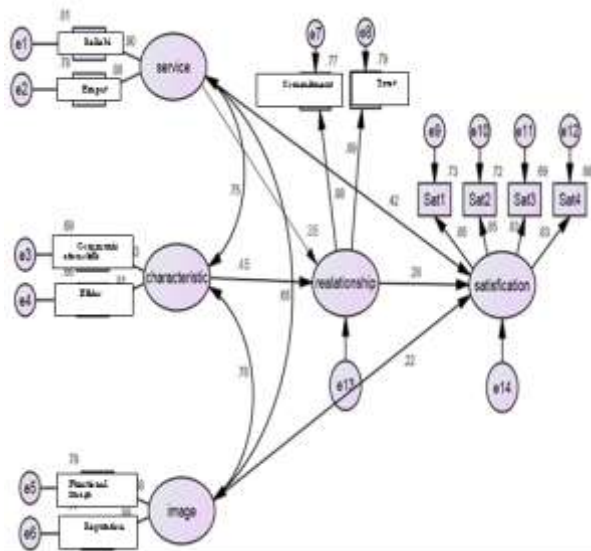


Figure 3-1. Standardized parameter estimation for relationship paths in goodness of fit model.

With the exception of the parameter estimation for service quality on relationship quality (0.351), estimations of the latent variables of factor loadings and observed residuals achieved significance. As a whole, the observational variables offered validity good enough for establishing a measurement model for goodness of fit, as shown in Fig. 3-1.

4. Results and discussion

4.1 Results of SEM models

Analysis of the figures and tables above showed that fire safety inspection service quality had the highest explanatory power of 51.8% on service satisfaction, followed by image of fire departments on service satisfaction (22%), and fire safety inspector characteristics on service satisfaction through relationship quality (12.6%). In the fire safety inspection service quality variable, reliability had the highest contribution, with factor loadings at 0.9 and validity at 0.81. In the fire safety inspector characteristic variable, communication skills had the highest contribution, with factor loadings at 0.83 and

validity at 0.69. In the image of fire departments variable, functional image had the highest contribution, with factor loadings at 0.881 and validity at 0.78. In the relationship quality variable, trust had the highest contribution, with factor loadings at 0.89 and validity at 0.79. Bloemer and Kasper (1995)⁶⁰ investigated corporate image, service quality, and customer satisfaction in the service industry and found that service quality had the greatest and significant positive influence on customer satisfaction. This study reached the same empirical conclusion: fire safety inspection service quality had significant direct influence on service satisfaction and had significant direct influence on service satisfaction through relationship quality, with explanatory power of 51.8%. With the exception of the hypothesis for the relationship between fire safety inspection service quality and relationship quality, other hypotheses, which are fire safety inspector characteristics on relationship quality, image of fire departments on service satisfaction, and relationship quality on service satisfaction, were confirmed. The following are analysis and discussions of the research dimensions.

4.1.1. Hypothesis testing and discussions on the influence of fire safety inspection service quality on relationship quality

This study revealed that the standardized direct effectiveness value of fire safety inspection service quality on relationship quality was 0.35. However, the p-value was 0.228, not achieving causal significance, which could be the result of the inclusion of fire safety inspector characteristics as a variable in this study. Wu et al. (2006)⁶¹ investigated the recreational sports service industry using LISREL for model analysis and found that relationship quality

⁶⁰ J. Bloemer, and H. D. P. Kasper, "The complex relationship between consumer satisfaction and brand loyalty," *Journal of Economic Psychology*, vol. 16, no. 2, pp. 311-329, July 1995.

⁶¹ M. J. Wu, D. J. Yang, and T. Y. Huang, "The effect of relationship quality on customer loyalty in the recreational sports service industry: The mediating effect of satisfaction," *NCYU Journal of Physical Education, Health & Recreation* (5), pp. 146-154, 2006.

had direct significant effect on and positive correlation with satisfaction. Empirical study by Wong and Sohal (2002)⁶² confirmed that service quality had positive influence on relationship quality. The quality of fire safety inspection services is critical to the safety of lives and property, which makes them different from the business models of regular corporations. Moreover, fire safety inspection is regulated by a responsibility area system, in which individual fire safety inspectors are legally responsible for the safety inspection of the spaces in their jurisdiction, setting these responsibilities apart from the kind of services provided by regular corporations, where random employees serve random customers. Therefore, the non-significant influence of fire safety inspection service quality on relationship quality could be the result of the fact that fire safety inspector characteristics (communication skills and ethics) had more influence than fire safety inspection service quality (reliability and empathy). This means that even with good relationship quality, no causal relationship could be established between relationship quality and fire safety inspection service quality.

4.1.2. Hypothesis testing and discussions on the influence of fire safety inspection service quality on service satisfaction

This study found that fire safety inspection service quality had positive influence on service satisfaction, with significant causal relationship. Fire safety inspection service quality influenced service satisfaction directly and indirectly through relationship quality. The direct effectiveness value was 0.42 and the indirect effectiveness value was 0.098, with t-values both achieving significance. Therefore, the overall effectiveness of 0.518 also achieved significance with t-value of 6.317. Fire safety inspection service quality included reliability and empathy, with reliability having the higher reliability of 0.81 and empathy having a reliability of

⁶² A. Wong, and A. Sohal, "Customers' perspectives on service quality and relationship quality in retail encounters," *Managing Service Quality*, vol. 12, no. 6, pp.424-433, December 2002.

0.78. Both operational dimensions should be valued. They had higher explanatory powers on reliability and empathy, with reliability values of 0.70 and 0.64, respectively. In the future, fire safety inspectors should continue to enhance service attitude and friendliness to improve fire safety inspection service quality. The positive perception of fire safety inspection service quality from the public can help increase service satisfaction. Meirovich and Bahnan (2008)⁶³ also pointed out that service quality is an antecedent variable for satisfaction, which means that service quality can be enhanced to achieve customer satisfaction. Relevance among customer satisfaction, service quality, and image of fire departments show that service quality directly influences customer satisfaction. Therefore, the influence of service quality on customer satisfaction should be taken seriously. This study confirms this conclusion, in that better quality of fire safety inspection service directly increases service satisfaction, with significant influence.

4.1.3. Hypothesis testing and discussions on the influence of fire safety inspector characteristics on service satisfaction

The influence of fire safety inspector characteristics on service satisfaction was only indirectly effective through relationship quality. Because there was no direct influence, the direct effectiveness value was 0. The total indirect effectiveness value was 0.126, with a significant t-value. Therefore, the overall effectiveness was 0.126. Fire safety inspector characteristics included communication skills and ethics. Communication skills had the higher reliability of 0.69, and ethics had a reliability of 0.66. Both operational dimensions should be valued. The variables of communication skills and ethics had higher explanatory power, with reliability values at 0.71 and 0.72. Although the

⁶³ G. Meirovich, and N. Bahnan, "Production/Service quality and emotional aspect of customer satisfaction," *Academy of Management Proceedings*, pp. 1-6, 2008.

public exhibited the highest satisfaction with the ethics of fire safety inspectors, with an average of 6.15, fire safety inspectors should continue to enhance communication skills and avoid recommending unnecessary fire safety equipment, thus improving the communication skills and ethics of fire safety inspectors. Wray et al. (1994)⁶⁴ found that in the pharmaceutical industry, salesperson characteristics had positive influence on satisfaction through the mediating effect of relationship quality. Swan et al. (1988)⁶⁵ investigated the relationship between the purchaser and the characteristics of salespeople and found that good salesperson characteristics improved relationship quality. Tseng (2007)⁶⁶ investigated fire safety equipment providers in Taoyuan, Taiwan and found that good salesperson characteristics were carried over to the relationship quality of fire safety equipment salespeople. Applying fire safety inspector characteristics to fire safety inspection work yielded the same conclusion: With better communication skills and higher ethics standards, fire safety inspectors improve service satisfaction through relationship quality (commitment to and trust with the public).

4.1.4. Hypothesis testing and discussions on the influence of image of fire departments on service satisfaction

This study revealed that image of fire departments had positive influence on service satisfaction, with direct causal relationship. Image of fire departments had direct effectiveness on service satisfaction, with direct effectiveness value of 0.22 and a significant t-value. Without an indirect

effectiveness value, the overall effectiveness was 0.22. Image of fire departments included functional image and reputation. The reliability for functional image was 0.78, and the reliability for reputation was 0.77. Both operational dimension should be valued. They had higher explanatory power on reputation of fire departments (administrative effectiveness on services and work performance) and functional image (ensuring the safety of lives and property), with reliability values of 0.73 and 0.69, respectively. Although the public responded with the highest satisfaction to “Fire departments have better image than other government agencies” with an average of 6.28, fire departments should continue to promote their services and their image of protecting the lives and property of the public through print and digital media. Koo (2003)⁶⁷, Yoo and MacInnis (1998)⁶⁸, and Nguyen and Leblanc (2001)⁶⁹ showed that corporate image influenced customer satisfaction, with positive causal relationship, meaning that corporate image can be applied beyond businesses. Applying the concept to government agencies, so that they provide public-oriented policies, can yield the same results. Therefore, corporations can create a good image to improve consumer trust and customer satisfaction. This study concluded that image of fire departments influence the service satisfaction with fire departments, with positive significant correlation. Therefore, fire departments should enhance and promote their functional image and reputation to help improve service satisfaction.

⁶⁴ B. Wray, A. Palmer, and D. Bejou, “Using Neural Network Analysis to Evaluate Buyer-Seller Relationships,” *European Journal of Marketing*, vol. 28, no. 10, pp. 32-48, October 1994.

⁶⁵ J. E. Swan, I. F. Trawick, D. R. Rink, and J. J. Roberts, “Measuring dimensions of purchaser trust of industrial salespeople,” *Journal of Personal Selling and Sales Management*, vol. 8, no. 1, pp. 1-9, May 1988.

⁶⁶ H. H. Tseng, “The study of Customer Voluntary Performance the Fire Control Safety Facility-The Research Area Covered Was Taoyuan County,” National Dong Hwa University, 2007, pp. 86.

⁶⁷ D. M. Koo, “Inter-relationships among store images, store satisfaction, and store loyalty among Korea discount retail patrons,” *Asia Pacific Journal of Marketing and Logistics*, vol. 15, no. 4, pp. 42-71, December 2003.

⁶⁸ P. Yoo, and D. J. MacInnis, “Effects of store characteristics and in-store emotional experiences on store attitude,” *Journal of Business Research*, vol. 42, no. 3, pp. 253-263, July 1998.

⁶⁹ N. O. Nguyen, and G. Leblanc, “Corporate image and corporate reputation in customer’s retention decision in services,” *Journal of Retailing and Consumer Services*, vol. 8, no. 4, pp. 227-236, July 2001.

4.1.5. Hypothesis testing and discussions on the influence of relationship quality on service satisfaction

This study found that relationship quality had positive influence on service satisfaction, with direct causal relationship. Relationship quality had a direct effectiveness value of 0.28 on service satisfaction, with a significant t-value. Relationship quality included commitment and trust. Trust had the higher reliability of 0.79, and commitment had 0.77. Both operational dimensions should be valued. "Fire safety inspectors deliver on promises," and "I believe in the results of inspection results" had higher explanatory power on commitment and trust, with reliability values of 0.72 and 0.67. Although the public had the highest satisfaction with "You generally trust fire safety inspectors" (averaging 5.67), fire inspectors should continue to deliver promises made to the public and ensure that the results of fire safety inspections are robust, which are ways to guarantee commitment and trust with the public. "When you voice your needs, fire safety inspectors can provide the best solution" received an average of 4.75, lower than other items, showing that the public was not satisfied with the solutions provided by fire safety inspectors. A reasonable explanation is that when fire safety inspectors perform their duties according to laws and regulations, their actions may clash with some members of the public. Therefore, fire safety inspectors need to enhance their expertise and train in explaining relevant laws and regulations and address concerns from the public, so that the public can have options of solutions that are safe and compliant with regulations. Doing so can also help fire safety inspectors gain public support through better communication skills. McDugall and Levesque (2000)⁷⁰ proposed a customer satisfaction model based on the service industry and found that customer satisfaction was influenced by the factors of core quality, relationship quality, and perceived value.

They also pointed out that relationship quality positively influenced customer satisfaction.

For service satisfaction, the most influential factor was fire safety inspection service quality, followed by image of fire departments and fire safety inspector characteristics. To improve fire safety inspection service quality, the top priority would be enhancing the reliability of fire safety inspection services for the public. For instance, the dedicated service attitude exhibited by fire safety inspectors had the highest explanatory power on reliability. To improve image of fire departments, the top priority would be enhancing functional image. For instance, the impression that fire departments ensure the safety of lives and property had the highest explanatory power. To enhance fire safety inspector characteristics, the top priority would be improving the communication skills of fire safety inspectors. For instance, clear explanations to the public by fire safety inspectors had the highest explanatory power. Long-term commitment and level of trust in relationship quality are also factors that influence service satisfaction, showing that service quality, corporate image, relationship quality, and personnel characteristics apply to both private corporations as well as government agencies. In the age of service, for the ethics and communication skills of fire safety inspectors to allow the public to feel reliability and empathy could effectively enhance service satisfaction. In so doing, elder care and long-term care facilities could be expected to decrease casualties, property damage, or even fire hazards altogether.

Román and Ruiz (2005)⁷¹ revealed that high levels of ethics in salespeople positively influenced satisfaction, trust, and commitment of customers with the salespeople. Based on the literature above, this study concluded that the relationship quality of long-term interactions between the public and fire safety inspectors would be influenced by fire safety inspector characteristics.

⁷⁰ H. G. McDugall, and T. Levesque, "Customer satisfaction with service: putting perceived value into the equation," *Journal of Services Marketing*, vol. 14, no. 5, pp. 392-410, September 2000.

⁷¹ S. Román, and S. Ruiz, "Relationship outcomes of perceived ethical sales behavior: The customer's perspective," *Journal of Business Research*, vol.58, no. 4, pp. 439-445, April 2005.

4.2 Significance of the research results for management

In terms of studies on satisfaction with fire departments in Taiwan, there have been analysis on the service satisfaction regarding paramedic care provided by firefighters; analysis on the satisfaction with fire safety education performed by fire departments and Women's Fire Prevention Awareness Groups; and work satisfaction analysis on firefighters. There had not been satisfaction research that considered fire safety inspection with service quality. Based on the managerial philosophy of private corporations, this study applied service quality to fire safety inspections performed by fire departments, using dimensions of fire safety inspector characteristics, image of fire departments, and relationship quality to investigate service satisfaction. Reliability and empathy were two variables included for investigating fire safety inspection service quality. Corporate image was adapted as image of fire departments and included the variables of functional image and reputation. Salesperson characteristics were adapted as fire safety inspector characteristics and included communication skills and ethics. Relationship quality included commitment and trust. Customer satisfaction was adapted as service satisfaction. The results of this study confirmed the empirical research by most researchers. Based on past literature, this study investigated causal relationships among fire safety inspection service quality, fire safety inspector characteristics, image of fire departments, relationship quality, and service satisfaction. Using questionnaires, a measurement model for fire departments consisting of five dimensions was developed. Eight factors (reliability, empathy, communication skills, ethics, functional image, reputation, commitment, and trust) were extracted from the model using confirmatory factors. It was confirmed that fire safety inspection service quality, image of fire departments, and relationship quality had significant positive influence on service satisfaction. Fire safety inspection service quality had the highest explanatory power on service satisfaction, followed by image of fire departments, then fire safety inspector characteristics, which had explanatory power on service satisfaction through relationship quality. This suggests that fire safety

inspection service quality positively influences customer satisfaction. Pan (2007) and Hu (2011) believed that the level of satisfaction of customers with salespeople influenced satisfaction with the salespeople and even the organization for which the salespeople work. Román and Ruiz (2005) proposed that perceived service quality influences customer satisfaction with salespeople, which confirms the prediction by the hypothesis in this study. Fire safety inspection service quality and fire safety inspector characteristics had significant positive influence on service satisfaction through the mediating effect of relationship quality. Reliability was the variable with the highest contribution in fire safety inspection service quality; Communication skill was the variable with the highest contribution in fire safety inspector characteristics; Functional image was the variable with the highest contribution in image of fire departments; and trust was the variable with the highest contribution in relationship quality. Structural equation model proved them to have adequate goodness of fit with observed data. In addition, based on reliability and validity analyses, the measurement model in this study had good reliability and validity and would be suitable for subsequent research. There had been fire safety research on elder care facilities, which were mostly case studies or studies that used scientific software to derive concrete time values in terms of disaster evacuation. However, less research applied results practically to fire safety inspection. This study used structural equation model to establish a fire safety inspection service quality hypothesis and test its goodness of fit, while incorporating the concept of fire safety in elder care facilities into fire safety inspection, with the aim to view fire safety inspection from the perspective of service quality, to help it achieve the purpose of ensuring safety of lives and property while improving service satisfaction. Therefore, the integrated investigation in this study was innovative. The following are its contributions in terms of practice and management.

1. In recent years, government agencies have implemented the "Government Service Quality Award" program, which has incentivized local agencies to improve service quality with friendliness and care, so that the public find reliability and trust in their government. This is also the purpose of fire safety inspections, to protect the safety of lives and property.

2. Image of fire departments had significant positive influence on service satisfaction. Fire departments can promote public policies through media to improve their functional image and reputation, which would positively influence their image and enhance service satisfaction.

3. With good image, fire departments can more easily gain support from private non-profit and for-profit organizations in implementing fire safety policies, allocate resources to minority groups, and enhance the images of fire departments and the organizations.

4. Relatively little past research involved the personnel characteristics variable. This study found that good communication skills and ethics in fire safety inspector characteristics helped improve trust in the inspection results by fire safety inspectors and service satisfaction through “commitment” and extended periods of interaction.

5. In terms of executing fire safety inspections, focus should be placed on the quality of fire safety inspections. In addition to inspection of fire safety equipment, instructions on using fire and electric appliances as well as emergency response should be provided, instead of increasing inspection frequency, as was the method in the past, so that mistakes in response to fire can be avoided to prevent tragedies.

5. Conclusions

With high fire safety inspection service quality, good image of fire departments, and fire safety inspectors with good communication skills and ethics, through persistent efforts, service satisfaction can be improved. More importantly, education on fire safety should be conducted for owners and fire safety managers of elder care and long-term care facilities, so that they understand the difficulty of escape for the occupants and formulate fire prevention plans accordingly. Examples include centralized control of heat sources, adopting inflammable furnishing materials, replacing old wiring, and careful use of electric appliances. Examples of emergency response for fires include automatic sprinkling systems, which are better than indoor fire hydrants or fire extinguishers. Automatic fire alarm systems and household fire alarms help early detection of fires. Promoting these measures and educating on choice

and use of firefighting equipment as well as the importance of notifying fire departments in a timely manner help enhance the ability of the public to respond to fires, which can minimize casualties, property loss, and chances of fire. When existing legal facilities and new small-scale welfare facilities fail to conform to fire and construction regulations in terms of fire safety and escape equipment, government agencies can implement subsidies or incentive programs for installing household fire alarms, automatic sprinkling systems, automatic fire extinguisher cabinets, water supply for automatic sprinkling, as well as for replacing flammable interior decoration with inflammable materials. Fire safety inspectors and fire safety technicians can be ordered to implement inspection management systems and log fire safety inspection visits to ensure the safety of their jurisdictions. By improving fire risk management and emergency response plans, educating caretakers on fire safety and emergency response, and implementing fire safety engineering practices, elder care facilities can decrease fire risks, limit loss, and maximize survival rate of their occupants.

Based on previous research findings and management implications, better fire safety inspection service quality lead to higher service satisfaction, and better image of fire departments lead to higher service satisfaction, which can serve as reference for future needs of improving service satisfaction. Fire safety inspector characteristics influence service satisfaction through long-term commitment and trust relationships, meaning that communication skills and ethics should be valued in the screening process for fire safety inspectors in order to improve the overall service quality of fire departments.

Analysis on the model in this study revealed that among variables that influence service satisfaction, the most significant ones are, in order of effectiveness, fire safety inspection service quality (0.518), image of fire departments (0.22), and fire safety inspector characteristics (0.126). Empirical evidence explained the importance of fire safety inspection service quality in fire safety inspections and suggested that although public administration belong in the public sector, marketing concepts can still be applied to understand public opinions and survey service satisfaction, based on which to adjust

policies. Therefore, fire safety inspections are more than simple enforcement of regulations. Emphasis should be placed on the ethics and communication skills of the inspectors. Fire safety inspectors should educate owners of facilities and the public on fire prevention and fire response, from the perspective of empathy for the lives of others, in accordance with public policies, which can effectively improve fire safety inspection service quality. Media contact departments should also be established to promote the image and reputation of fire departments.

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References

- [1] SINA.com (2013, September 8). Retrieved from <http://news.sina.com.tw/focusreport/society/726.html>.
- [2] Control Yuan (2013, October 15). Retrieved from http://www.cy.gov.tw/sp.asp?xdURL=../di/edoc/db2.asp&edoc_no=2&ctNode=911.
- [3] C. Grönroos, "A service quality model and its marketing implications," *European Journal of Marketing*, vol. 18, no. 4, pp. 36-44, April 1984.
- [4] J. R. Evans, and W. M. Lindsay, *The Management and Control of Quality*, 6th ed., South-Western College Pub., 2004, pp.77.
- [5] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "A conceptual model of service quality and its implication for future research," *Journal of Marketing*, vol. 49, no. 4, pp. 41-50, September 1985.
- [6] A. Parasuraman, L. Berry, and V. Zeithaml, "Servqual: A multiple-item scale for measuring customer perceptions of service quality," *Journal of Retailing*, vol. 64, no. 1, pp. 12-40, January 1988.
- [7] W. E. Sasser, R. P. Olsen, and D. D. Wyckoff, *Management of service operations: text and cases*, Boston: Allyn and Bacon, 1978.
- [8] M. Al-hawari, "The influence of traditional service quality factors on customer satisfaction: a practical study within the context of Australian banking," *The Business Review*, Cambridge, vol. 11, no. 2, pp. 114-119, December 2008.
- [9] L. Hu, and P. M. Bentler, "Cutoff criteria for fit index in covariance structural Equation Modeling," *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 6, no. 1, pp. 1-55, November 2009.
- [10] W. S. Chou, "Management for Service Industry," National Open University, 2003, pp. 128.
- [11] K. E. Boulding, *The image*, Michigan: University of Michigan Press, 1956.
- [12] R. M. Worcester, *Consumer market research handbook*, New York: McGraw-Hill Book Company, 1972.
- [13] A. Oxenfeldt, "Developing a favorable price-quality image," *Journal of Retailing*, vol. 50, no. 4, pp.8-14, 1974.
- [14] C. G. Walters, *Consumer behavior: An integrated framework*, New York: Richard, D. Irwin Inc.,1978.
- [15] E. R. Gray, and J. M. T. Balmer, "Managing corporate image and corporate reputation," *Long Range Planning*, vol. 31, no. 5, pp. 695-702, October 1998.
- [16] N. O. Nguyen, and G. Leblanc, "Corporate image and corporate reputation in customer's retention decision in services," *Journal of Retailing and Consumer Services*, vol. 8, no. 4, pp. 227-236, July 2001.
- [17] N. K. L. Pope, K. E. Voges, and M. R. Brown, "The effect of provocation in the form of mild erotica on attitude to the AD and corporate image: Differences between cause-related and product based advertising," *Journal of Advertising*, vol. 33, no. 1, pp.69-82, March 2004.
- [18] W. Tang, "Impact of corporate image and corporate reputation on customer loyalty: A review," *Management Science and Engineering*, vol. 1, no. 2, pp. 57-62, December 2007.
- [19] K. L. Keller, *Building and Managing of Corporate Brand Equity*, London: Oxford University Press, 2000.
- [20] C. Flavián, M. Guinalú, and E. Torres, "The influence of corporate image on consumer trust: A comparative analysis in traditional versus internet banking," *Internet Research*, vol. 15, no. 4, pp. 447-470, September 2005.
- [21] J. Mathieu, and D. Zajac, "A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment," *Psychological Bulletin*, vol. 108, no. 2, pp. 171-194, September 1990.
- [22] C. Burmann, K. Schaefer, and F. Maloney, "Industry image: its impact on the brand image of potential employees," *Journal of Brand Management*, vol. 15, no. 3, pp. 157-176, September 2008.
- [23] T. Levitt, "Production-line approach to service," *Harvard Business Review*, vol. 50, no. 2, pp. 41-52, 1983.
- [24] L. A. Crosby, K. R. Evans, and D. Cowles, "Relationship quality in services selling: An interpersonal influence perspective," *Journal of Marketing*, vol. 54, no. 3, pp. 68-81, July 1990.
- [25] J. B. Smith, "Buyer, seller relationships: similarity, relationship management and quality," *Psychology and Marketing*, vol. 15, no. 1, pp. 3-21, December 1998.
- [26] J. C. Anderson, and D. W. Gerbing, "Structural equation modeling in practice: A review and recommended two-step approach," *Psychological Bulletin*, vol. 103, no. 3, pp. 411-423, May 1988.
- [27] E. Garbarino, and M. S. Johnson, "The different roles of satisfaction, trust and commitment in customer relationships," *Journal of Marketing*, vol. 63, no. 2, pp. 70-87, April 1999.
- [28] T. Tellefsen, and G. P. Thomas, "The antecedents and consequences of organizational and personal commitment in

- business service relationships,” *Industrial Marketing Management*, pp. 23-37, January 2005.
- [29] R. M. Morgan, and S. D. Hunt, “The commitment-trust theory of relationship marketing,” *Journal of Marketing*, vol. 58, no. 3, pp. 20-38, July 1994.
- [30] G. T. Gundlach, S. R. Achrol, and T. J. Mentzer, “The structure of commitment in exchange,” *Journal of Marketing*, vol. 59, no. 1, pp. 78-92, January 1995.
- [31] C. Pierre, T. S. Dagger, and O. Don, “Service quality, trust, commitment and service differentiation in business relationships,” *Journal of Services Marketing*, vol. 24, no. 5, pp. 336-346, August 2010.
- [32] J. A. Howard, and J. N. Sheth, *The theory of buyer behavior*, New York: John Wiley and Sons, 1967.
- [33] R. L. Day, “Extending the concept of consumer satisfaction,” *Atlanta: Association for Customer Research*, vol. 4, no. 1, pp. 149-154, 1977.
- [34] M. Pfaff, “The index of consumer satisfaction measurement problem and opportunity,” *The conceptualization of consumer satisfaction and dissatisfaction*, In H. Keith Hunt (Eds.), UK. Cambridge: Marketing Science Institute, 1977.
- [35] R. L. Oliver, “A cognitive model of the antecedents and consequences of satisfaction decisions,” *Journal of Marketing Research*, vol. 17, no. 4, pp. 460-469, November 1980.
- [36] G. A. Churchill, and C. Surprenant, “An investigation into the determinants of customer satisfaction,” *Journal of Marketing Research*, vol. 19, no. 4, pp.491-504, November 1982.
- [37] J. Singh, “Voice, exit, and negative word of mouth behavior: an investigation across three service categories,” *Journal of the Academy of Marketing Science*, vol. 18, no. 1, pp. 1-15, December 1990.
- [38] C. Fornell, “A national customer satisfaction barometer: the Swedish experience,” *Journal of Marketing*, vol. 56, no. 1, pp.1-18, January 1992.
- [39] E. W. Anderson, C. Fornell, and D. R. Lehman, “Customer satisfaction, market share, and profitability: findings from Sweden,” *Journal of Marketing*, vol. 58, no. 3, pp. 53-66, July 1994.
- [40] R. A. Spreng, S. B. MacKenzie, and R. W. Olshavsky, “A reexamination of the determinants of customer satisfaction,” *Journal of Marketing*, vol. 60, no. 3, pp.15-32, July 1996.
- [41] C. Parker, and B. P. Mathews, “Marketing intelligence and planning,” *Bradford*, vol. 19, no. 1, pp.38-40, 2001.
- [42] P. T. Pan, “A study on service quality and customer satisfaction in table tennis club in Taipei,” *National Taiwan Normal University*, 2007, pp. 47- 48.
- [43] J. C. J. Hsu, and C. M. Hsu, “The relationships between service quality and customer satisfaction in a leading Chinese web 2.0 company,” *The Business Review*, Cambridge, vol. 11, no. 1, pp. 84-89, 2008.
- [44] H. Y. Hu, “Relationships amongst patient satisfaction, relationship inertia, and loyalty in nephrology dialysis patients,” *The Journal of Health Science*, Taipei, vol. 13, no. 2, pp. 89-100, 2011.
- [45] G. W. Allport, *Personality: A psychological interpretation*. New York: Holt, 1937.
- [46] P. F. Chen, “Applying structural equation modeling to study the influence of leadership, organizational culture, organizational learning, job satisfaction, organizational commitment and the organizational performance --An empirical study of life insurance industry in Taiwan,” *National Dong Hwa University*, 2006, pp. 25.
- [47] J. E. Swan, I. F. Trawick, D. R. Rink, and J. J. Roberts, “Measuring dimensions of purchaser trust of industrial sales people,” *Journal of Personal Selling and Sales Management*, vol. 8, no. 1, pp.1-9, May 1988.
- [48] Y. H.Chuang, “A Study on the relationship between call center sales staff and customer purchase intention-the comparison of consumer financial products and wealth management products,” *Journal of Management*, Ming Chuan University, vol. 9, no. 4, pp. 25, 2012.
- [49] C. A. Lai, “A Study on Service Quality, Relationship Quality and Recommendation -An Empirical Study of the Golf Club,” *Chaoyang University of Technology*, 2013, pp. 6.
- [50] J. C. Olson, and P. J. Paul, *Consumer Behavior: Marketing Strategy Perspectives*, New York: Richard, D. Irwin, Inc., 1987, pp. 312-314.
- [51] V. A. Zeithaml, and M. J. Bitner, *Service Marketing*, NY: Hill, McGraw, 1996, pp. 128.
- [52] A. Caruana, “Service loyalty: the effects of service quality and the mediating role of customer satisfaction,” *European Journal of Marketing*, vol. 36, no. 7/8, pp. 811-828, August 2002.
- [53] E. E. Rigdon, “Rethinking partial least squares path modeling: In praise of simple methods,” *Long Range Planning*, vol. 45, no. 5-6, pp. 341-358, October 2012.
- [54] J. Hair, M. Sarstedt, T. Pieper, and C. Ringle, “The use of partial least squares structural equation modeling in strategic management research: A review of past practices and recommendations for future applications,” *Long Range Planning*, vol. 45, no. 5-6, pp. 320-340, November 2012a.
- [55] J. F. Hair, M. Sarstedt, C. Ringle, and J. Mena, “An assessment of the use of partial least squares structural equation modeling in marketing research,” *Journal of the Academy of Marketing Science*, vol. 40, no. 3, pp. 414-433, March 2102b.
- [56] J. Evermann, and M. Tate, “Comparing out of sample predictive ability of PLS, covariance, and regression models,” *Proceedings of the 35th international conference on information systems (ICIS)*, Auckland, New Zealand, 2014.
- [57] K. G. Jöreskog, “A General Method for Estimating a Linear Structural Equation System.” In A. S. Goldberger & O. D. Duncan (Eds.), *Structural Equation Models in the Social Sciences*, New York: Seminar, 1973, pp. 85-112.
- [58] P. M. Bentler, “Some contributions to efficient statistics in structural models: specification and estimation of moment structures,” *Psychometrika*, vol. 48, no. 4, pp. 493-517, December 1983.
- [59] J. C. Anderson, and D. W. Gerbing, “Structural equation modeling in practice: a review and recommended two-step approach,” *Psychol Bull*, vol. 103, no. 3, pp. 411-423, May 1988.

- [60] E. G. Carmines, and J. P. McIver, "Analyzing Models with Observable Variables," In G. W. Bohrnstsd, & E. F. Borgatta, (Eds.), *Social Measurement: Current Issues*, pp. 65-115, 1981.
- [61] J. S. Tanaka, and G. J. Huba, "A general coefficient of determination for covariance structure models under arbitrary GLS estimation," *British Journal of Mathematical and Statistical Psychology*, vol. 42, no. 2, pp. 233-239, November 1989.
- [62] L. Hu, and P. M. Bentler, "Cutoff Criteria for Fit Index in Covariance Structural Equation Modeling," *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 6, no. 1, pp.1-55, November 2009.
- [63] J. C. Loehlin, *Latent variable models: An introduction to factor, path and structural analysis*, 2nd ed., Hillsdale, NJ: Lawrence Erlbaum, 1992.
- [64] R. E. Schumacker, and R. G. Lomax, *A Beginner's Guide to Structural Equation Modeling*, 2nd ed., Mahwah, NJ: Lawrence Erlbaum Associates, 2004.
- [65] J. Bloemer, and H. D. P. Kasper, "The complex relationship between consumer satisfaction and brand loyalty," *Journal of Economic Psychology*, vol. 16, no. 2, pp. 311-329, July 1995.
- [66] M. J. Wu, D. J. Yang, and T. Y. Huang, "The effect of relationship quality on customer loyalty in the recreational sports service industry: The mediating effect of satisfaction," *NCYU Journal of Physical Education, Health & Recreation* (5), pp. 146-154, 2006.
- [67] A. Wong, and A. Sohal, "Customers' perspectives on service quality and relationship quality in retail encounters," *Managing Service Quality*, vol. 12, no. 6, pp.424-433, December 2002.
- [68] G. Meirovich, and N. Bahnan, "Production/Service quality and emotional aspect of customer satisfaction," *Academy of Management Proceedings*, pp. 1-6, 2008.
- [69] B. Wray, A. Palmer, and D. Bejou, "Using Neural Network Analysis to Evaluate Buyer-Seller Relationships," *European Journal of Marketing*, vol. 28, no. 10, pp. 32-48, October 1994.
- [70] J. E. Swan, I. F. Trawick, D. R. Rink, and J. J. Roberts, "Measuring dimensions of purchaser trust of industrial salespeople," *Journal of Personal Selling and Sales Management*, vol. 8, no. 1, pp. 1-9, May 1988.
- [71] H. H. Tseng, "The study of Customer Voluntary Performance the Fire Control Safety Facility-The Research Area Covered Was Taoyuan County," *National Dong Hwa University*, 2007, pp. 86.
- [72] D. M. Koo, "Inter-relationships among store images, store satisfaction, and store loyalty among Korea discount retail patrons," *Asia Pacific Journal of Marketing and Logistics*, vol. 15, no. 4, pp. 42-71, December 2003.
- [73] P. Yoo, and D. J. MacInnis, "Effects of store characteristics and in-store emotional experiences on store attitude," *Journal of Business Research*, vol. 42, no. 3, pp. 253-263, July 1998.
- [74] N. O. Nguyen, and G. Leblanc, "Corporate image and corporate reputation in customer's retention decision in services," *Journal of Retailing and Consumer Services*, vol. 8, no. 4, pp. 227-236, July 2001.
- [75] H. G. McDugall, and T. Levesque, "Customer satisfaction with service: putting perceived value into the equation," *Journal of Services Marketing*, vol. 14, no. 5, pp. 392-410, September 2000.
- [76] S. Román, and S. Ruiz, "Relationship outcomes of perceived ethical sales behavior: The customer's perspective," *Journal of Business Research*, vol.58, no. 4, pp. 439-445, April 2005.