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DEVELOPING CUSTOMER SATISFACTION MODELS: AN APPLICATION TO AL-AIN MUNICIPALITY CUSTOMER SERVICE CENTER

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Key Words

Customer Satisfaction Index; Customer Loyalty and Trust; ServQual; Goodness of fit; Structural Equations Modeling; Survey Sampling.

Abstract

Customer satisfaction models are developed for the services provided by Al-Ain Municipality Customer Service Center (AMCSC) to:(i) measure its output quality, (ii) prioritize its future efforts to improve quality, and (iii) be used for competitive and cross-institution benchmarking. In those models customer expectations and perception of quality were introduced as the antecedents of customer satisfaction and customer trust. The methodology used, combines survey input with causes and effects modeling to produce indices of satisfaction, and the drivers and outcomes of satisfaction. The survey data was collected via a stratified systematic random sample of the customers who visited AMCSC in spring 2008. The model parameters were estimated using the Structural Equations Models (SEMs) procedure in LISREL version 8.54. The results of various goodness-of-fit measures show that the fitted SEMs produced satisfactory results. Although the customer satisfaction and trust scores indicated high levels of satisfaction and client trust, opportunities for quality improvements were identified and some recommendations were provided.

1. Introduction

In mid-1990's, the Customer Satisfaction Index (CSI) was gradually recognized by governments and company's worldwide as a good instrument to gauge a nation's or company's output quality. In the CSI model, customer expectations, perception of quality and perceived value were introduced as the antecedents of customer satisfaction, customer loyalty/trust, and customer complaint.

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The CSI allows benchmarking between the public and private sectors, and for each customer segment, between one year's results and the next. While using a common methodology, the CSI produces information unique to each agency on how its activities that interface with the public affect the satisfaction of customers. The effects of satisfaction are estimated in terms of specific objectives (such as loyalty or trust in the agency).

In order to build CSI models, the need arises to measure customer satisfaction, which has led to the development of measuring instruments. ServQual is the most common method for measuring service quality. It compares customers' expectations before service and their perceptions for the actual service delivered. ServQual can thus be defined as the difference between customer expectations of the services and the perceived services (Seth and Deshmukh, 2005; Sureshchandar *et al.,* 2001; Parasuraman *et al.,* 1988).

The following five dimensions were identified as the key measures for ServQual: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. Tangibles refer to physical facilities, equipment, and appearance of personnel. Reliability relates to the organization's ability to perform the promised service dependably and accurately, while Responsiveness is the willingness to help customers and provide prompt service. Assurance refers to the knowledge and courtesy of employees and their ability to convey trust and confidence to the customer, whereas Empathy is the caring and individualized attention the organization provides its customers.

In the current study CSI models are developed for the services provided by Al-Ain Municipality Customer Service Center (AMCSC). The study aims to help AMCSC enhance its services and prioritize future efforts to improve quality and, through quality, customers' satisfaction and trust. The CSI models are also intended to be used for competitive and cross-institution benchmarking, where AMCSC could compare the quality of its services with other local and international institutions.

The rest of the paper is organized as follows. In Section 2, a detailed literature review on customer satisfaction is presented. The methodology used to produce indices of satisfaction, as well as the drivers and outcomes of satisfaction is described in Section 3. That includes survey instruments, Structural Equations Models (SEMs) development, and data collection. The results are presented in Section 4, including composite reliabilities, the goodness of fit measures, and department specific

satisfaction scores. Section 5 includes a discussion of the results followed by recommendations in Section 6.

2. Literature Review

As far back as 1970s, researchers of consumer behavior and marketing in developed countries have begun comprehensive studies on customer satisfaction (Churchill and Sprenant, 1982; Oliver, 1977). Customer satisfaction refers to "customers' overall evaluation of their purchase and consumption experience" (Edvardsson *et al.*, 2000). On this view, the evaluation of a product or a service experience evolves over time. The national satisfaction surveys that form the basis for satisfaction indices in the United States, Sweden, Norway and other countries are examples of cumulative satisfaction studies. A second and complementary conceptualization defines satisfaction in terms of customer evaluation of a specific product transaction or service experience (Olsen and Johnson, 2003).

Customer satisfaction has been studied from the perspective of individual customers and the drivers of their satisfaction (Fournier and Mick, 1999; Oliver, 1993; Oliver and Swan, 1989) as well as from an industry-wide perspective to compare customer satisfaction scores across firms and industries (Fornell *et al.,* 1996; Fornell, 1992).

Loyalty is defined as a customer's intention or predisposition to repurchase from the same firm again (Edvardsson et al., 2000). As such, it encompasses an affective component as well as a behavioral dimension. As an affective state, loyalty represents a psychological reaction and conviction to a product or service experience. The behavioral dimension is simply a manifestation of that affective state, which is sometimes equated with customer retention. In other words, loyalty encompasses intended behavior and whether or not the intended behavior actually occurs (Gustafsson and Johnson, 2002). According to Dick and Basu (1994), consumer loyalty plays a central role in both marketing strategy and marketing planning, in the achievement of brand loyalty, vendor loyalty in industrial marketing, service loyalty in service sector, and store loyalty in the retail sector. The marketing literature defines loyalty as an attitude or behavioral intention (Hallowell, 1996).

The concepts of satisfaction and loyalty have been embedded in satisfaction models underlying the national satisfaction indices in several advanced countries. For example, in 1989, Fornell and his colleagues in Michigan University helped Sweden build the

first nation-level measurement system of customer satisfaction; the Swedish Customer Satisfaction Barometer (SCSB) (Fornell, 1992). Later in 1994, the American Customer Satisfaction Index (ACSI) was launched (Fornell et al., 1996). These models gave rise to several other indices, such as the European Customer Satisfaction Index (ESCI) and the conceptual model leading to the European Performance Satisfaction Index (EPSI) (Kristensen and Westlund, 2000).

Given the importance of customer satisfaction and loyalty to firms' long-term survival and growth, a great deal of research effort has focused on investigating the relationship between these concepts and their impact on customer retention and ultimately on firms' performance. Martensen *et al.* (2000) examined the ECSI model from a cross-industry (soft drinks, banking and telecommunications) perspective in Denmark. They found that company image is an important driver of customer satisfaction and loyalty, while perceived quality has a relatively minor impact. Grønholdt *et al.* (2000) discussed the relationship between customer satisfaction and loyalty in the same context, and confirmed that satisfaction is a strong predictor of loyalty. Edvardsson *et al.* (2000) examined the effects of satisfaction and loyalty on company performance (measured by profits), using the Swedish Customer Satisfaction Index. Interestingly, they found that loyalty has a negative impact on company profits in the manufacturing sector, while that impact is positive in the service sector, including the telecommunications industry. Bruhn and Grund (2000) introduced and tested the Swiss Index of Customer Satisfaction and mentioned moderators to the satisfaction-loyalty relationship (without attempting to estimate them). They found that satisfaction explains close to 100% of loyalty in the telecommunication industry. Cassel and Eklöf (2001) examined the fit of the ECSI model across different European countries and industries (including telecommunications, banking and retailing). Their findings suggest that the model is robust across different contexts.

Today, the CSI has become a universal indicator of customer evaluations of the quality of goods and services available to consumers/ clients. It is the only uniform, cross-industry/ government measure of customer satisfaction. Fornell *et al.* (2006), found evidence that it is possible to systematically outperform the market using ACSI-based trading strategies. Hart (2007) suggested that one of the best promising places to start boosting customer satisfaction is customer service. Aksoy *et al.* (2008) presented findings from ACSI-based trading strategies.

3. Methodology

The methodology used for this research combines survey input with cause and effect modeling to produce indices of satisfaction, and the drivers and outcomes of satisfaction.

The mission of Al-Ain Municipality is to offer differentiated municipal services through competent human capital and state of art systems for Al Ain City and its districts while maintaining its unique characteristics and authenticity. Accordingly, AMCSC was asked to identify major customer segments, central to its mission, from which to measure satisfaction, and the causes and effects of that satisfaction. AMCSC chose three customer segments comprising of clients who have dealt with AMCSC in the previous two years for the purpose of conducting transactions with the Departments of Governmental Housing & Real Estate Registration, Building Permits, and Roads & Traffic. Three survey instruments were designed to be segment-specific in terms of activities and outcomes, but with a common format that allows cause and effect modeling using the CSI model.

AMCSC designated customer's trust as the most important outcome for the customer segments measured. Client Trust was measured by probing the respondent's willingness to say positive things about the services provided by the target department. Such willingness will be denoted "positive attitude" in the sequel. Since the latent variable trust is defined by the single indicator "positive attitude", it is unreasonable to assume that its error variance is zero. Instead, it is argued that an arbitrary reliability value of 0.85 is a better assumption than an equally arbitrary value of 1 (Joreskog and Sorbom, 1993). In this regard, it is recommended to use more than one indicator of trust in future research.

Furthermore, for measuring the quality of services provided by the Customer Service Center, AMCSC in conjunction with the research team has identified indicators for the Serv-Qualfive drivers of satisfaction. These indicators were: Tangibles, measured by questions on the availability of clear instructions to apply for the services (T1) and facilities (T2); Responsiveness, measured by questions on the procedures (RS1) and processing (RS2); Reliability, measured by questions on knowledge & skills (R1) and effectiveness (R2); Empathy, measured by questions on courtesy (E1), accessibility (E2) and Assurance, measured by questions on abiding by the "First In First Out (FIFO)" principle (A1) and ability to answer concerns (A2).

Two other components were identified as major drivers of satisfaction.

The first was the customer's expectations of the overall quality of AMCSC as an agency with which to do business -- expectations prior to use or, for longer term users, prior to recent use. The second was his/her perception of the overall quality of AMCSC as an agency with which to do business after having had experience doing such business.

Customer satisfaction was measured using the three indicators: overall satisfaction (S1), providing services short of or exceeded expectations (S2), and comparison of the service providing department to an ideal one (S3).

The effects of the above mentioned drivers on customer satisfaction were estimated using three CSI Structural Equations Models (SEMs) developed for this study. The models for Governmental Housing & Real Estate Registration, Building Permits and Roads & Traffic are shown in Figures 1-3. It should be mentioned that the impacts (regression coefficients) in these models are all significant at the 0.05 level of significance.

These models should be viewed as cause and effect models that move from left to right, with the Customer Satisfaction Index (CSI) in the middle. The ovals are latent variables (factors) that are measured by multiple indicators (shown at the tips of the small arrows). The large arrows connecting the latent variables represent the strength of the effect of the factor at the left, on the one to which the arrow points at the right. These arrows represent "impacts". The larger is the number on the arrow, the more effect the factor at the left has on the one at the right. The meanings of the numbers shown in these models are discussed in the sequel.

The survey data was collected via a stratified (by segment) systematic random sample of the customers who visited AMCSC in spring 2008. The demographic profiles of the respondents are described in Sections 4.3-4.5. These profiles were reviewed with AMCSC and are believed to represent the population of AMCSC customers. The personal interviews were conducted by professional interviewers selected by AMCSC and trained by the research team. Two hundred and fifty (250) interviews were completed for each of the customers of the Departments of Governmental Housing & Real Estate Registration and Building Permits, in contrast to one hundred and sixty seven (167) interviews for the less frequent customers of the department of Roads & Traffic.

The sixteen questions in each instrument were answered on a 1-10 scale. However, the weighted averages were transposed and reported as in-

dices on a 0-100 scale in the sequel following the norm in the literature.

4. The Results

4.1. Composite Reliabilities

The models for Governmental Housing & Real Estate Registration, Building Permits and Roads & Traffic are shown in Figures 1-3. The model parameters were estimated using the structural equations modeling procedure in LISREL version 8.54.

The composite reliabilities of the various factors appear in Table 1. According to Bagozzi and Yi (1988), composite reliabilities greater than about 0.6 are desirable, which is the case for most factors in Table 1. Although a few composite reliabilities are a little short of the suggested 0.6 threshold, their respective factors were considered in the process of building SEMs. The goodness of fit of the resultant models is discussed in the next section.

4.2. Goodness-of-Fit Measures

The structural equations model (SEM) and its assumptions imply a covariance structure $\sum(\theta)$ for the observable random variables (indicators), where θ is a $tx1$vector of parameters. It is assumed that the empirical data is a random sample of size N on which k indicators have been observed or measured. From this data a sample covariance matrix S is computed. The SEM is fitted by minimizing a fit function $F[S, \sum(\theta)]$.

Let $\hat{\theta}$ be the value of θ that minimizes $F[S, \sum(\theta]$ for a given sample covariance matrix S, and let $n = N\text{-}1$. To test the model, one may use $c = n\,F[S, \sum(\hat{\theta}]$.If the model holds, c is approximately distributed in large samples as χ^2 with $d = s - t$ degrees of freedom, where $s = k(k+1)/2$.

Table 1
Composite (Factor) Reliabilities

Factor	Governmental Housing & Real Estate	Building Permits	Roads & Traffic
Tangibles	0.53	0.70	0.57
Responsiveness	0.97	(a)	(a)
Reliability	0.63	0.60	0.56
Empathy	(a)	(a)	0.65
Assurance	0.63	0.97	0.74
Customer Satisfaction	0.94	0.95	0.93
Trust	0.49	0.52	0.56

(a) This driver of satisfaction was dropped from the analysis because it was highly correlated with the other drivers of satisfaction.

To compare alternative models, e.g., the fitted model versus the saturated model, one may use the Akaike Information Criterion (AIC): $AIC = c + 2t$, or the Expected Cross Validation Index (ECVI): $ECVI = (c/n) + 2(t/n)$.The $ECVI$ is a single sample cross validation index and although it is quite similar to AIC, its rational is quite different from that of AIC as it measures the discrepancy between the fitted covariance matrix and the expected covariance matrix that would be obtained in another sample of the same size.

Since chi-square is $N-1$ times the minimum value of the fit function, it tends to be large in large samples if the model does not hold exactly. Consequently, models which hold approximately will be rejected in large samples. A number of other goodness-of-fit measures have been proposed to reduce such an explicit dependence on sample size. The Goodness-of-Fit Index (*GFI*) does not depend on sample size explicitly and measures how much better the model fits as compared to no model at all. It is defined as

$$GFI = 1 - F[S, \sum(\hat{\theta}]/F[S, \sum(0],$$

whereas the goodness-of-fit index adjusted for degrees of freedom (*AGFI*) is defined as

$$AGFI = 1 - \frac{k(k-1)}{2d}(1 - GFI).$$

Another class of fit indices measures how much better the model fits as compared to a baseline model, usually the independence model. Let c_i be the chi-square values for the independence model, and d_i be the corresponding degrees of freedom. Further, let $f = c/d$, $f_i = c_i/d_i$, $\tau = max\{c - d, 0\}$ and $\tau_i = max\{c_i - d_i, c - d, 0\}$.The Normed Fit Index (*NFI*) is defined as$NFI = 1 - c/c_i$. The Non-Normed Fit Index (*NNFI*) is defined as $NNFI = (f_i - f)/(f_i - 1)$.The Comparative Fit Index (*CFI*) is defined as $CFI = 1 - \tau/\tau_i$.

To account for the errors of approximation, for models that do not hold exactly, consider the discrepancy function $\hat{F}_0 = max\{(c - d)/n, 0\}$. Since $\hat{F}_0$ decreases when parameters are added in the model, the Root Mean Square Error of Approximation (RMSEA) is proposed as a measure of discrepancy per degree of freedom. It is defined as $\sqrt{\hat{F}_0/d}$.

Table 2 gives some goodness-of-fit measures, namely, chi-squared (c) with the associated degrees of freedom (d) and p-value, *AGFI*, *NNFI*, *CFI*, *RMSEA* and *ECVI*.

The observed Chi-squared statistics in Table 2 are highly significant as the p-values are ≤ 0.0022. However, Hartwick and Bakri (1994) noted that "in large samples, the chi-square statistic will almost always be significant,

Table 2
Goodness-of-Fit Measures

	Governmental Housing & Real Estate	Building Permits	Roads & Traffic
Chi-squared (c)	114.15	86.34	107.13
Degrees of freedom (d)	68	49	69
p-value	0.0004	0.0008	0.0022
AGFI	0.91	0.91	0.86
NNFI	0.96	0.98	0.98
CFI	0.97	0.99	0.98
RMSEA	0.052	0.055	0.062
ECVI	0.75	0.59	1.18
ECVI (saturated model)	0.84	0.64	1.36
ECVI (independence model)	6.89	12.14	14.98

since chi-square is a direct function of sample size". Consequently, they suggested other measures of overall model goodness of fit, namely, that chi-square/degrees of freedom $(c/d) \leq 3$, $NNFI \geq 0.90$, and $CFI \geq 0.90$, see also Segars and Groove (1993) and Chau (1997). Table 2 shows that the observed values of these measures satisfy the recommended conditions.

Further, Bagozzi and Yi (1988) stated that a value of *AGFI* equal to or greater than about 0.9 suggest meaningful models from a pragmatic point of view. On the other hand, Browne and Cudeck (1993) suggest that values of *RMSEA* up to 0.08 represent reasonable errors of approximation in the population. Using these additional benchmarks, it is apparent from Table 2 that the fitted SEMs produced satisfactory results. Another indication that the SEMs fit well is that the value of *ECVI* is less than the corresponding values of *ECVI* for the full and independence models for each of the three SEMs. Also, the inspection of standardized residuals did not reveal any violations of assumptions.

4.3. The Governmental Housing & Real Estate Registration Model

The demographic profile of the respondents to the Governmental Housing & Real Estate Registration survey shows that 95% are males and 5% are females. The average age of respondents is 34, with 45% under the age of 30 and only 6% are 50 or older. About 47% have college education, 14% have high school diploma whereas 39% have some primary/preparatory education. Around 45% are

nationals, 42% are Arabs and 13% are Asians.

It should be noted that Empathy was very highly correlated with the other four drivers that it was deemed redundant and was consequently dropped from the analysis. The results for the eight indicators of the four basic drivers of satisfaction are as follows on a 0-100 scale: for Tangibles, clarity of instructions is lowest at 83, a significant 7 points less than the rating of facilities, for Responsiveness, the performance score is 83, one point less than that of procedures, for Reliability, knowledge & skills are scored at 85, two points less than effectiveness, whereas for Assurance, abiding by the FIFO principle is highest at 92, three points more than the score for the ability to answer customers' concerns.

With regard to the four identified drivers of satisfaction, Assurance scores 90, highest. Tangibles and Reliability are second at 86, while Responsiveness is third at 83. On the other hand, concerning the two major drivers of satisfaction, customer expectations (anticipated quality) is estimated at 75, while overall quality is estimated at 86. Hence, quality surpasses expectations by a significant margin (11 points). These six estimates have resulted in a perceived quality score of 86.

The three indicators of satisfaction were scored at 81, 83 and 88 for the comparison to ideal, the agreement between experienced and anticipated quality and overall satisfaction, respectively. The 2008 CSI for the Governmental Housing & Real Estate Registration survey is 84 on a 0-100 scale. The AMCSC index of Client Trust is 86 on a 0-100 scale. The clients have indicated confidence that AMCSC will continue to provide high quality services related to the Department of Governmental Housing & Real Estate Registration.

In examining the effects or impact of each component on the subsequent components in the model of Figure 1 we find that Responsiveness has the highest impact on Perceived Quality at 0.38, followed by Reliability at 0.34, Assurance at 0.30, while Tangibles have a smaller impact of 0.21. Further, Perceived Quality has an impact of 0.97 on CSI, which in turn has an impact of 0.70 on Client Trust. Impact scores should be read as the effect on the subsequent component if the component at the tail of the arrow were to be improved by one point. Thus, if Responsiveness were improved by 7 points (from 83 to 90), Perceived Quality would increase from 86 to 88.7 ($86 + 7 \times 0.38$). The CSI would in turn increase by 2.6 ($7 \times 0.38 \times 0.97$) to become 86.6. By the same token, client trust would also go up

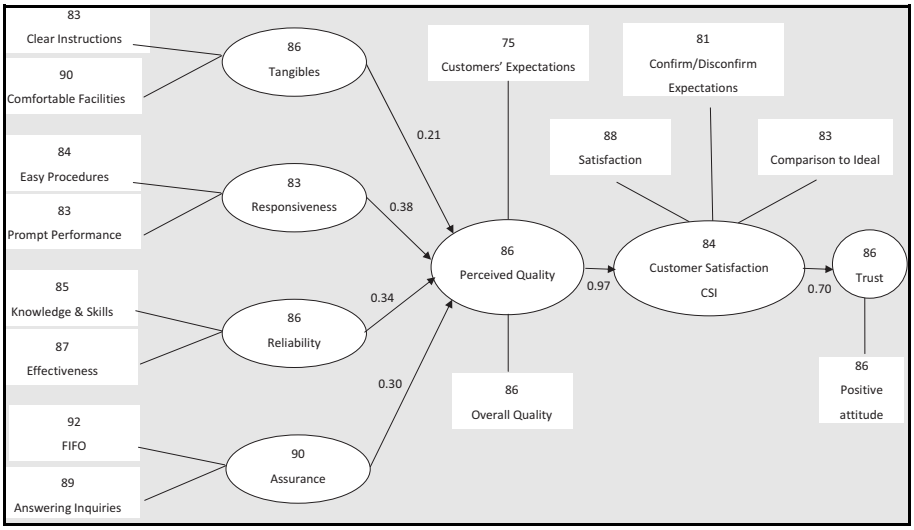

Figure 1: Model for the Department of Governmental Housing and Real Estate

by 1.9 ($7 \times 0.38 \times 0.97 \times 0.70$) to become 87.9.

Obviously, all drivers of satisfaction offer opportunities for improvement. But since Assurance already scores relatively high, further improvements in this aspect, while by no means impossible, will be more difficult to achieve. In contrast, Reliability, Tangibles and particularly Responsiveness are good candidates for focusing improvement efforts. Also, more efforts should be directed towards improving the clarity of instructions as it had the lowest score among the eight indicators. In fact, although Tangibles have a smaller impact, if the clarity of instructions score were improved from 83 to 90, the score of Tangibles would go up 4 points which is bound to increase the Perceived Quality score and CSI by about one point each.

4.4. The Building Permits Model

The demographic profile of the respondents to the Building Permits survey shows that 99% are males and 1% are females. The average age of respondents is 37, with 31% under the age of 30 and only 11% are 50 or older. About 63% have college education, 8% have high school diploma whereas 27% have some primary/preparatory education. Around 13% are nationals, 69% are Arabs and 19% are Asians.

For this model (shown in Figure 2), both Empathy and Responsiveness were highly correlated with the other three drivers, thus, they were deemed redundant and were dropped from the

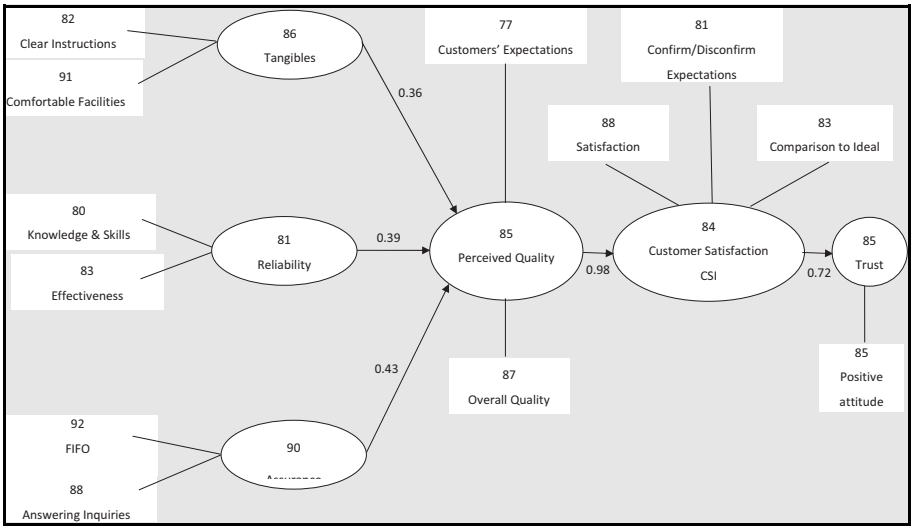

Figure 2: Model for the Department of Building Permits

analysis. The results for the six indicators of the three basic drivers of satisfaction were as follows on a 0-100 scale: for Tangibles, clarity of instructions is lowest at 82, a significant 9 points less than the rating of facilities, for Reliability, knowledge & skills are scored at 80, three points less than effectiveness, whereas for Assurance, abiding by the FIFO principle is highest at 92, four points more than the score for the ability to answer customers' concerns.

With regards to the three identified drivers of satisfaction, Assurance scored 90, highest, followed by Tangibles at 86 and Reliability at 81. On the other hand, concerning the two major drivers of satisfaction, customer expectations (anticipated quality) is estimated at 77, while overall quality is estimated at 87. Hence, quality surpasses expectations by a significant margin (10 points). These five estimates have resulted in a perceived quality score of 85.

The three indicators of satisfaction were scored at 83, 81 and 88 for the comparison to ideal, the agreement between experienced and anticipated quality and overall satisfaction, respectively. The 2008 CSI for the Building Permits survey is 84 on a 0-100 scale which is similar to the CSI score for the Department of Governmental Housing and Real Estate. The index of Client Trust is 85 on a 0-100 scale, which suggests customers' confidence that AMCSC will continue to provide high quality services related to the department of Building Permits.

With regard to the components' impact, Assurance has the highest impact on Perceived Quality at 0.43, followed by Reliability at 0.39, while Tangibles have a smaller impact of 0.36. Further, Perceived Quality has an impact of 0.98 on CSI, which in turn has an impact of 0.72 on Client Trust. Thus, improving Reliability by 9 points (from 81 to 90) would increase Perceived Quality from 85 to 88.5 (85 + 9 ×0.39). The CSI would in turn increase by 3.4 to become 87.4. By the same token, Client trust would also go up by 2.5 to become 87.5.

Here, Tangibles and Reliability are good candidates for improvement. This can be achieved by targeting higher scores for the ratings of clear instructions (for Tangibles) and knowledge & skills and Effectiveness for Reliability. Realizing a score of 90 for these three items would increase the Perceived Quality score and CSI by about 5 points each.

4.5. The Roads and Traffic Model

The demographic profile of the respondents to the Roads & Traffic survey shows that 99% are males and 1% are females. The average age of respondents is 36, with 30% under the age of 30 and only 15% are 50 or older. About 66% have college education, 9% have high school diploma whereas 25% have some primary/preparatory education. Around 15% are nationals, 73% are Arabs and 12% are Asians.

For this model (Figure 3), Responsiveness was highly correlated with the other four aspects and was dropped

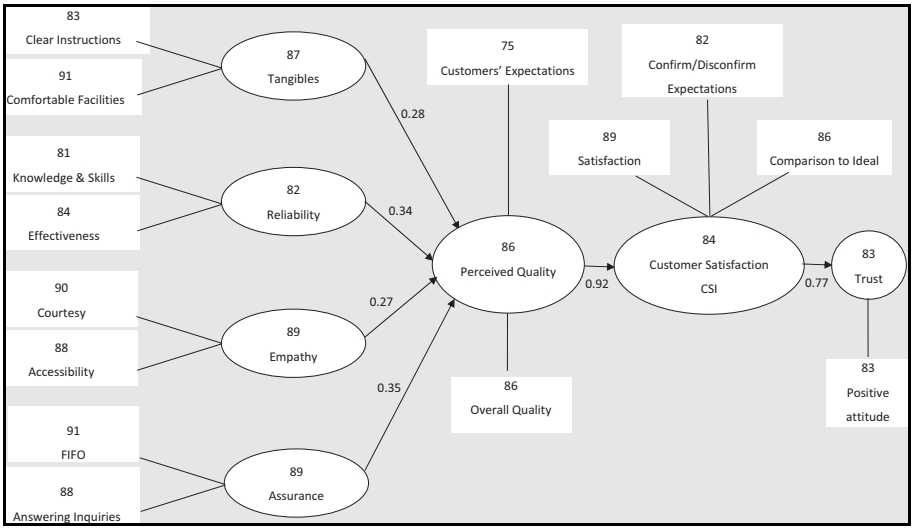

Figure 3: Model for the Department of Roads and Traffic

out of the analysis. The results for the eight indicators of the four basic drivers of satisfaction are as follows on a 0-100 scale: for Tangibles, clarity of instructions is lowest at 83, a significant 8 points less than the rating of facilities, for Reliability, knowledge & skills are scored at 81, three points less than effectiveness, whereas for Assurance, abiding by the FIFO principle is highest at 91, three points more than the score for the ability to answer customers' concerns. For Empathy, courtesy scored 90, 2 points higher than accessibility.

With regards to the four identified drivers of satisfaction, Assurance and Empathy scored 89, highest, followed by Tangibles at 87 and Reliability at 82. On the other hand, concerning the two major drivers of satisfaction, customer expectations (anticipated quality) is estimated at 75, while overall quality is estimated at 86. Hence, quality surpasses expectations by a significant margin (11 points). These six estimates have resulted in a perceived quality score of 86.

The three indicators of satisfaction were scored at 86, 82 and 89 for the comparison to ideal, the agreement between experienced and anticipated quality and overall satisfaction, respectively. The 2008 CSI for the Roads and Traffic survey is 84 on a 0-100 scale which is similar to the previous CSI scores. The index of Client Trust is 83 on a 0-100 scale; again suggesting clients' confidence in the quality of services related to the Department of Roads and Traffic.

Assurance has the highest impact on Perceived Quality at 0.35, followed by Reliability at 0.34, while Tangibles and Empathy have smaller impacts of 0.28 and 0.27 respectively. Further, Perceived Quality has an impact of 0.92 on CSI, which in turn has an impact of 0.77 on Client Trust. Here, Tangibles and Reliability are good candidates for improvement. This can be achieved by targeting higher scores for the ratings of clear instructions (for Tangibles), knowledge & skills, and Effectiveness (for Reliability). Realizing a score of 90 for these three items would increase the Perceived Quality score and CSI by about 4 points.

5. Discussion

In this study indices of customer satisfaction and trust were computed to evaluate the clients' satisfaction with the quality of services provided by the Customer Service Center on behalf of the Departments of Governmental Housing & Real Estate, Building Permits, and Roads & Traffic, see Table 3.

The CSI and Trust indices for the three departments are very similar and

Table 3
Customer Satisfaction Scores

		Governmental Housing & Real Estate	Building Permits	Roads & Traffic
Drivers of Satisfaction	Tangibles	86	86	87
	Responsiveness	83	[a]	(a)
	Reliability	86	81	82
	Empathy	(a)	(a)	89
	Assurance	90	90	89
Basic Drivers of Satisfaction	Expectation (Anticipated Quality)	75	77	75
	Overall quality	86	87	86
Perceived Quality		86	85	86
Customer Satisfaction Index (CSI)		84	84	84
Trust		86	85	83

(a) This driver of satisfaction was dropped from the analysis because it was highly correlated with the other drivers of satisfaction.

relatively high, with a CSI of 84 and a Trust Index ranging from 83 to 86. The similarity of these scores reflects the homogeneity of the quality of services across departments. The concept of "comprehensive employee" at the customer service center, where each employee provides services for all three departments, may have played an important role in homogenizing the quality of services. Moreover, the relatively high CSI and Trust scores indicate high levels of satisfaction and client trust.

For the surveyed customers, overall quality exceeded the anticipated quality by at least 10 points. This may reflect an improvement in the services provided nowadays as compared to the past and a lack of awareness of the customers of these recent improvements.

When comparing the drivers of satisfaction, we find that Assurance has systematically scored highest with a score close to 90. Assurance was measured by the abidance to the "First in First Out" principle and the employees' ability to answer customers' concerns. On the other hand, Reliability and Responsiveness scored lowest in each department, with scores in the low to mid-eighties. Responsiveness reflects the easiness and smoothness of the service delivery process and the promptness in processing applications, while Reliability is measured by the level of the employees' knowledge & skills, and their effectiveness in delivering the services.

Table 4
Impact of Drivers of Satisfaction on Customer Satisfaction and Trust

Drivers	Governmental Housing & Real Estate	Building Permits	Roads & Traffic
	Regression Coefficient on Perceived Quality		
Tangibles	0.21	0.36	0.28
Responsiveness	0.38	(a)	(a)
Reliability	0.34	0.39	0.34
Empathy	(a)	(a)	0.27
Assurance	0.30	0.43	0.35
	Regression Coefficient on Satisfaction (CSI)		
Perceived Quality	0.97	0.98	0.92
	Regression Coefficient on Trust		
Customer Satisfaction Index	0.70	0.72	0.77

(a) This driver of satisfaction was dropped from the analysis because it was highly correlated with the other drivers of satisfaction.

Tangibles had intermediate scores of about 86. It was measured by the clarity of instructions for applying to the service and the level of comfort of the facilities at the customer service center.

Consequently, the Reliability and Responsiveness aspects of the service are the best candidates for focusing future improvement efforts, because of their low scores and high impact on the CSI, see Table 4.

The other candidate for improvement is Tangibles, especially the clarity of instruction aspect which scored in the low eighties. However, Tangibles has a lower impact on CSI than Reliability and Responsiveness. So, for similar improvements in the scores, reliability and responsiveness will lead to a higher increase in the CSI.

6. Recommendations

In order to improve the customers' satisfaction and trust in the services provided by the customer service center on behalf of the Departments of Governmental Housing & Real Estate, Building Permits, and Roads and Traffic, it is recommended that Al-Ain Municipality reconsider the following drivers of satisfaction:

- The best candidates for improving customer satisfaction are Reliability and Responsiveness. Improvements

efforts should focus on the easiness and smoothness of the service delivery process, the promptness in processing applications, the level of the employees' knowledge & skills, and their effectiveness in delivering the services. A plausible target for these improvement efforts is to raise the scores of satisfaction about reliability and responsiveness to 90.

- Another area of improvement is the clarity of instructions to apply for the services (Tangibles). Steps should be taken to improve the access of customers to this type of information. In light of the sizeable segment of customers with a low education level (from 25 to 39 percents), this information should be provided in diverse formats, i.e., information boards, online, and through appropriately staffed information desks. Also, other efficient means of information should be sought.
- Assurance scores are relatively high, so further improvements in this aspect, while by no means impossible, will be more difficult to achieve.

Al-Ain Municipality is also advised to repeat this study periodically to monitor the impact of service improvement plans and efforts on customer satisfaction. The results of these studies will help the Municipality management focus on effective areas of improvements.

Because the current customer satisfaction indices are high, any future improvements in the quality of services will be reflected by small incremental increases in the CSI. Therefore, in order to discriminate between genuine increases in the CSI from variations due to sampling errors, the sample size of interviewed customers should be increased. The sample sizes used in this study were 250 for the Governmental Housing & Real Estate and Building Permits Departments and 167 for the Roads and Traffic Department.

To better identify aspects of the services that need improvement, more indicators should be used to measure the scores of the five drivers of satisfaction, that is, Tangibles, Reliability, Responsiveness, Empathy and Assurance. In this study, two indicators were used to measure each of the five drivers of satisfaction.

The proposed methodology can be applied to any other public (governmental) or private organizations. The only changes would concern customers' segmentation as well as the drivers and outcomes of satisfaction, e.g., using loyalty as an outcome for private organizations. The best use of such studies is for learning how customers evaluate the services provided, then identifying which activities have the most impact on the perception of the quality delivered. Thus, the pro-

posed method can be regarded as a tool with which to prioritize future efforts to improve quality and, through quality, customer satisfaction and the desired outcome; loyalty/ trust.

It is also proposed to study the impact of segmentation on the results in future research. Indeed, it would be interesting to study the differences between the diverse segments (by gender; nationality; level of education, etc.). For this purpose the sample size needs to be much larger.

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الملخص

تطوير نماذج رضاء المستهلك: تطبيق على مركز خدمة العملاء ببلدية العين

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جامعة الإمارات العربية المتحدة

يطور هذا البحث نماذج لقياس درجة رضاء المستهلك باستخدام توقعات المستهلك وإدراكه لجودة الخدمة كمقدمات لرضائه وثقته، وذلك بإدماج مدخلات استطلاعات رأي المستهلك مع أساليب النمذجة السببية للحصول على أدلة الرضاء. وتم جمع بيانات استطلاعات الرأي باستخدام عينة عشوائية طبقية منتظمة من عملاء بلدية العين في ربيع ٢٠٠٨. وأكدت الاختبارات الإحصائية جودة توفيق النموذج المقترح، وأظهرت النتائج ارتفاع أدلة الرضاء والثقة، ومع ذلك تم تحديد بعض المجالات لتحسين جودة الخدمة واقتراح التوصيات اللازمة.

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