THE CUSTOMER SATISFACTION FEEDBACK LOOP FOR LOCAL TELEPHONE SERVICE

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ABSTRACT

Longitudinal customer satisfaction surveys are often performed in service industries to make a temporal evaluation of perceived service delivery, and to suggest ways in which the service could be improved from the customer's viewpoint. The experimental implementation of the suggested changes, followed by resurveying of the affected customers, forms a customer-service provider feedback loop which has the potential to foster continuous service improvements. In this paper, we discuss this loop, and will, in the process, describe recent cross sectional models for customer satisfaction with local telephone service, and evaluate their efficacy in guiding an extensive field experiment whose main goal was to raise those satisfaction levels. In analyzing the experimental results, recent results from the CS/D literature will be used and extended to contrast the static and dynamic modeling of customer satisfaction. The results of this analysis have consequences both for the completion of the feedback loop, that is, for the improvement of service and the changing of customer attitudes, as well as for the structure and content of the survey process which produced the results.

BACKGROUND

Every effective commercial customer satisfaction program has, as its ultimate goal, the identification of ways in which its offerings can be improved to be more acceptable to the customers in its market. In a service industry where brand switching is infrequent or impossible, such as the local telecommunications industry, subscriber bases can be surveyed longitudinally, and the customer evaluations generated thereby often become the very quantities providers hope to change through their service improvements. The interplay between customer survey satisfaction results and service changes then becomes a fairly tight feedback loop in which one series of survey results suggests improvements whose efficacy is indicated in an experiment where the survey questions constitute the major output variable.

The franchised telecommunications industry for the residential market presents a particular case of this scenario. Customers are virtually enjoined from switching suppliers, and the large majority use the same system for long periods of time. This situation, along with regulatory pressure and the desire to prove competitive in a potentially deregulated marketplace, causes subjective customer satisfaction to be treated as a goal in its own right, and to be tracked in longitudinal studies. Univariate results from these periodic studies are generally used to evaluate the offices and people providing the service, and to identify widespread or generic service problems. These general surveys gather large amounts of information about a customer's recent service experience, and are natural vehicles for that analysis of current service by which one may identify potential service improvements and predict their effect.

Although it is possible, and sometimes necessary, to repair individual service problems, it is well recognized that both the consistency and the general level of service is best improved by general programmatic changes. These changes tend to be extensive and their implementation lengthy, and since most subscribers use the service throughout the change period, there is great potential for perceptible service disruption. On the other hand, the customer base is sufficiently stable that many customers will witness both the pre- and post-improvement service, and can therefore act as a panel for the survey by which perception information is frequently gathered.

We will use these ideas of customer satisfaction feedback for a service offering in exploring a particular loop involving voice transmission quality for local residential telephone service. A periodic cross-sectional survey will be analyzed to suggest the importance and nature of voice transmission quality in affecting general subscriber satisfaction, and a resulting field experiment to improve transmission will be described, with its quantitative and organizational consequences interpreted.

THEORETICAL ANTECEDENTS

Customer satisfaction results from a trade-off of the benefits and costs of the customer's use of a product in light of his needs and expectations. It differs from attitude largely through its being a post-purchase affect (LaTour and Peat 1979), and the distinction therefore blurs for frequently or continuously provided services. Indeed, as a construct determined largely by disconfirmation, as defined as the difference between expectation and perceived performance (Churchill and Surprenant, 1982), customer satisfaction is, for some researchers, virtually indistinguishable from quality itself. In their gap model, Parasuraman, Zeithaml and Berry (1985) model service quality as just this sort of disconfirmation. Satisfaction is also a post-use analog of value (Zeithaml 1988) in that it incorporates quality perceptions, cost assessments and a usage context with reference conditions. Although there are obvious face differences between perceived quality and customer satisfaction, and slightly more subtle differences between satisfaction and perceived value, these constructs are unlikely to be highly differentiated in field work where telephone surveys constitute the major data gathering mode. This is confirmed by Drew and Bolton (1987), who found high correlations among the concepts of perceived quality, perceived value and stated intention to recommend a service .

Oliver (1981) argues that satisfaction is characterized by the surprise a customer experiences after a purchase, and that the surprise eventually becomes an input to a less dynamic attitude. It follows that for frequently purchased

or continuously consumed offerings, particularly where changes in the offering may be subtle, there may be little measurable difference between satisfaction and attitude.

Customer satisfaction is usually modeled through some form of the disconfirmation paradigm, where satisfaction results when an offering performs better than expected, and dissatisfaction results from expectations exceeding performance. Various forms of expectations have been proposed in the literature. Miller (1977) distinguished among minimum tolerable, predicted, desirable and ideal performance, and Barbeau (1985) contrasted predictive expectations and normative expectations. The latter author finds that predictive expectations have some influence on satisfaction, but that normative expectations do not. There are, of course, many ways in which a customer can arrive at a predictive expectation, including advertising, word-of-mouth or past experience. For experienced users of a regularly provided product or service, it is likely that past experience will be the dominant driver of customer predictions. (Indeed, a GTE study of residential customer expectations confirms that this is the case for local telephone service.)

Both Churchill and Surprenant (1982) and Swan and Trawick (1980) find that performance itself is a major antecedent of customer satisfaction. Churchill and Surprenant conclude, in fact, that for the durable good in their study, performance and satisfaction are not well distinguished. Swan (1988) argues that performance is a theoretical antecedent of satisfaction (even with disconfirmation held constant) insofar as increased performance increases the probability of fulfilled need and values. As an alternative argument, Barbeau (1985) notes that satisfaction depends on the offering's comparison with an available ideal or best alternative. Satisfaction might then depend on performance insofar as increased performance decreases the gap between the evaluated offering and its alternatives.

It appears, then, that customer satisfaction is a function of perceived performance and the disconfirmation of predictive expectations. In the context of regularly-provided services, such as telephone service or other utilities, it seems likely that prior experience is the dominant form of predictive expectations. There is also evidence, either through situational involvement studies directly related to satisfaction (Bolfing and Woodruff, 1988) or through satisfaction's relation to service value (Zeithaml, 1988), that customer satisfaction is affected by idiosyncratic reference conditions.

The arguments we have given for inclusion of performance measures have been couched in terms of general service quality. There are also a variety of arguments for this model form for the specific case of local telephone service. First, one might argue that a model whose inputs include disconfirmation might very well require the inclusion of both expectation and performance measures insofar as some form of the difference constitutes disconfirmation. Use of all three guards against nonlinearities in disconfirmation's effect on satisfaction. Theoretically, though, if disconfirmation were a mathematical difference between performance and expectation, only one of these two measures would be needed, as the third would be redundant. Earlier literature suggests that expectation, as the cognitive prior of the two constructs, should be the measure included in the model. Expectations first, performance second, however, is not necessarily the appropriate order for a passive service like local telephone service. Outstanding performance may very well define one's nebulous expectations, so that one may not be able to define poor service, but can know it when it appears. Thus, performance has at least as large a claim to model inclusion here as expectation does.

Customers' ratings of services which are perceived to have clear and distinct attributes may decrease when a long-standing attribute deteriorates. For example, the perceived quality and value of local telephone service may suffer when the company drops free telephone repair or charges for inside wire repair (as occurred during deregulation). On the other hand, clear service boundaries present opportunities when services are enhanced in natural ways. The reduced-price energy audits offered by some electric companies are sufficiently outside the bounds of ordinary electricity provision that they enhance quality or value. Hence, we expect that changes in service may trigger (positive or negative) disconfirmation experiences and affect perceived service quality or value. The importance of performance in determining satisfaction thus follows from the continuous-use nature of telephone service. We also note that such use encourages a mutual feedback loop between consumer's expectations and perceived performance, so that eventually the two are virtually indistinguishable. Churchill and Surprenant (1982) also make this argument.

A somewhat different line of argument for our exclusion of expectation measures in favor of performance items is the latter's subjective nature. Since one's rating of service is idiosyncratic and not objective, there is likely a measure of expectation built into the measure, which is compared with one's experiences to form a performance rating.

Finally, our system-wide sampling scheme is not designed to select subscribers who have experienced a potentially disconfirming event. Indeed, good telephone service is characterized by its stability, so that there is little opportunity for a customer to explicitly conceptualize his expectations about service. On the other hand, a performance assessment, being based on usage, is a more available construct than is expectation. It follows from this and our preceding arguments that we can model a customer's overall quality rating as a function of specific performance ratings and disconfirmation experiences.

Customer satisfaction can be conceived as a state in a dynamic process. Oliver (1981) argues that satisfaction is distinguishable from attitude only in its being a reaction to an event, such as a purchase taking place at a particular point in time. Few authors, however, have quantitatively described the temporal process surrounding a change in attitude, satisfaction or intention. LaBarbera and Mazursky (1983) study the effect of attitude and satisfaction on multiple purchase decisions. In his study of satisfaction antecedents, Oliver (1980) cites the Howard and Sheth (1969) model in which purchase-induced attitude change is written as a function of the discrepancy between prepurchase attitude and postpurchase satisfaction. In his formulation, a prepurchase attitude A_t leads to a postpurchase measure of satisfaction S_{t+1}, and the discrepancy between these two determine a revised

postpurchase attitude A_{t+2}. Thus,

(1) $A_{t+2} = f(S_{t+1} - A_t) + A_t$, or
(2) $A_{t+2} - A_t = f(S_{t+1} - A_t)$.

Thus, in words, a purchase-induced change in attitude is some function of the disconfirmation induced by the purchase. The quantity $S_{t+1} - A_t$ is a measure of disconfirmation because the attitude A_t is a function, among other things, of the customer's prepurchase expectations. We note that in fitting such a model, it might be prudent to include the attitude variable A_t, and therefore the perceived performance variables that attitude depends on, as separate explanatory variables in the attitude change equation. This caution follows from the lack of a theoretical requirement that the coefficient of A_t in (1) be unity. Thus, the basic form of our model will be:

(3) $A_{t+2} - A_t = f(S_{t+1} - A_t, A_t)$.

Thus, attitude change will be a function of both disconfirmation and of perceived performance. Note that in this model, which parallels that of Oliver (1980), the differences between variables are conceptual only, and need not be exactly equivalent to arithmetic subtractions. Under this premise, we will use this model as a basis for our later discussion of attitude change in telephone service ratings.

FIRST ANALYSIS IN THE LOOP: THE CROSS-SECTIONAL MODEL

Earlier, we outlined the extent and frequency of the customer surveys performed by most franchised suppliers of local telephone service. As omnibus surveys, the questionnaires are designed to detect both small scale service failures and large scale systematic aspects of service which customers feel should be altered. Data from these surveys are therefore intensely scrutinized by operations managers, and are periodically analyzed in more sophisticated ways by higher level managers.

In an earlier study, Bolton and Drew (1989) developed a model of residential customer's assessments of telephone service. The survey data on which these models were based were from a system-wide probability sample of GTE residential customers in 1985. In these surveys, the customer's recent telephone experiences are probed, their ratings of various service process attributes are reported, and overall service quality and value assessments are obtained. For example, customers are asked about their perceptions of quality through the item: "How would you rate the overall quality of services provided by your local telephone company? Would you say (1) Poor, ..., (4) Excellent?" It should be noted that the content of the full questionnaire covers most of the service quality concepts generally delineated by Parasuraman, Zeithaml and Berry (1985).

For this phase of the feedback loop, two parts of the residential customer model system are relevant here. One equation modeled the local call quality rating, LOC_QUAL, as a function of a small number of well-defined service attributes: provision of a dial tone, a correctly established connection to the dialed number, a static-free line, and a complete call without early disconnection. It was additionally hypothesized that a customer's evaluation of local service quality would additionally depend on his perceptions of the frequency of trouble with these four service process attributes. The quantities are labelled FDIAL, FCONNECT, FSTATIC and FCUTOFF.

In the second equation, a customer was considered to assess the overall quality of all services provided by the local telephone company (QUALITY) by forming intermediate quality assessments of core and facilitating services, and then weighing these intermediate assessments. Hence, overall quality was modeled as a function of the customer's assessments of seven services including LOC_QUAL) and a variety of other services, such as billing and repair. This equation also contained a set of variables measuring disconfirmation experiences, such as whether the customer's local telephone service had always been provided by GTE (GTE_ONLY), and how he assessed the extent of improvement in GTE service compared to a year ago (IMPROVE).

The two equations have forms which include, among others, the following terms:

(4) $QUALITY = a_0 + a_1 IMPROVE + a_2 GTE\_ONLY + a_3 LOC\_QUAL + a_4 LD\_QUAL + e_1$

(5) $LOC\_QUAL = z_0 + z_1 FSTATIC + z_2 FDIAL + z_3 FCONNECT + z_4 FCUTOFF + e_2$

The regression coefficients of these terms in the estimates from the full model system are given in Bolton and Drew (1989). We paraphrase the relevant aspects of the model fitting results here.

A wide variety of managerial and operational conclusions can be extracted from this system of equations. The set most important to our discussion of the telephone service delivery feedback system comprises the statements about the predominant effects of transmission quality on overall perceptions. We notice that:

1. The largest coefficient in the QUALITY equation, both in absolute and standardized size, is LOC_QUAL, the attribute rating for local dial service.
2. The largest standardized coefficient, and the second-largest absolute coefficient in the VALUE equation is again LOC_QUAL, thus demonstrating the (obvious) fact that local telephone service provision is the largest ingredient in either rating.
3. The long distance service provided (LD_QUAL) is less important than local service, but still significant.
4. In the attribute equations, both local quality and long distance quality are very highly affected by how frequently noise is heard on the telephone lines (FSTATIC). The standardized values of these coefficients is greater than for the general affect COURTESY.
5. None of the other coefficients give unambiguous directions for improving the customer's satisfaction level.

These equations thus make a clear suggestion to telephone company engineers: customer ratings depend in some way on the transmission quality of the calls they make, and its effect outweighs any other attribute of the service. Since voice transmission is central to the very definition of local telephone service, particularly among residential customers, this finding is not too surprising. (Note, however, that the even more central notion of dial tone provision does not have as great an effect as noisy lines.)

Note that we have implicitly assumed that the coefficients have predictive properties: a unit change in one of the exogenous variables will cause a corresponding rise in QUALITY or some other endogenous variable equal to the appropriate function of its associated model coefficients. We tentatively accept this view at this stage of the feedback process, but do not deeply believe in its validity. The data we consider here are cross-sectional, and we have no assurance that the mechanism causing endogenous change among different subjects at a given time is the same mechanism causing change in a given person over time. Therefore, the results of this analysis need corroboration, first from other information sources, and then from an experimental, or quasi-experimental application of the targeted operational changes.

Other information was available to reinforce these primary findings. The Corporate managers who examine these results were impressed by the consistency of the finding on static importance, as evidenced by its repetition through several years of survey data. It was also well-known in managerial circles that much aged transmission equipment, particularly in rural areas, could be expected to generate static. This was repeatedly confirmed by customer trouble reports and by network monitoring devices. The effect of all this evidence was to persuade company management to systematically implement a program of network improvements to substantially decrease telephone line noise.

SECOND ANALYSIS IN THE LOOP: AN EXPERIMENT AND ITS FEEDBACK

Network upgrades tend to be major projects, expensive to undertake and difficult to smoothly implement. Depending on the type of modification, the improvement must address a myriad of special conditions for preexisting equipment and for residential configurations. In this case, general standards for the residential loop (that part of the telephone network lying between the telephone company's central office and the customer's residence) were developed. Deficient telephone cable is replaced, cables are monitored nightly for electrical problems, and a variety of other technical changes are made.

A specific central office was selected for these programmatic changes, and two sites with 100 and 130 households each were chosen to receive the presumed improvements. At one of those sites, cable replacement and the other improvements were undertaken at a specified subset of the households. Two other sites in the same serving area (with approximately 200 households each) were selected as control groups because of the respective similarity of their physical plant to the two treated areas. The control groups were given the usual levels of service: installations were done, and repairs were made, but no large-scale construction projects were undertaken. No other controls were instituted, and no effort was made to systematically manipulate service in these locations except for the programmatic improvements. Because customers cannot be randomly assigned to treatment groups, we will refer to this sort of experimental design as a quasi-experiment.

Customers in all four areas were surveyed by telephone at three different points in time: approximately six months before the beginning of the construction associated with the improvements, approximately one month after the end of construction, and six months after that time. These points of time will be referred to as waves. For the first wave, the interviewing firm attempted to contact every household in the selected areas. At each subsequent wave, the same households were contacted as in the first wave, and in most of those recontacts, the same person was interviewed. This design thus avoided the high inter-person variability historically found in these types of surveys.

The same questionnaire was administered at each wave. In addition to the same overall quality (QUALITY) question, the same local call quality (LOC_QUAL) question, and the same service attribute questions (FSTATIC, FDIAL, FCONNECT, FCUTOFF) that were used in the cross-sectional study, customers were asked how their current service compared to that of six months earlier (CHANGE), and whether any other supplier had ever provided them with local service (GTE-ONLY). Some demographic questions (age, income, marital status, time at current address) comprised the remainder of the survey questions.

From an operational point of view, the survey results generated immediate interest centered on summary statistics. It was, of course, hoped that wave 1 to wave 2 differences would reveal a substantial gain in the QUALITY mean for the treated areas, with little change in the control areas. Summary statistics for each area, however, do not show such a simple pattern. Indeed, only the variable CHANGE shows this pattern, insofar as the percentage of respondents noting a great improvement ("Service ... much better.") is around 25% for the treated locations, but only 10-15% for the control areas. In contrast, QUALITY ratings decreased in one of the treated areas from wave 1 to wave 2, while they increased in one of the control areas. The desire to explain these and other anomalies was a major motivation in constructing the following models of customer attitude change.

Customer-perceived overall quality, as measured by the variable QUALITY$_t$ (t=1,2,3, where t indexes the survey wave) is of primary interest in our analysis. The statistical models for change in this variable are constructed in accordance with the CS literature we cited earlier, and with the theoretical arguments we gave above. As in equation (3), we equate Quality change with two measures of disconfirmation, a global measure of perceived service performance, and any other explanatory demographic information which might be helpful. The variables CHANGE$_t$, for t=2 and 3, are treated as disconfirmation measures, since they represent the discrepancy between current and past service, with past

service being a close proxy for the customer's predictive expectation for telephone service. In addition,a customer's normative expectations are likely a function of whether he or she has ever lived in a non-GTE serving area. Therefore GTE_ONLY is included as another possible disconfirmation variable. Finally, LOC_QUAL is included as an omnibus measure of current performance. In a second equation, LOC_QUAL is decomposed into the four service attributes given above. Our two equations, for each of the two later survey waves, then take on the following form for t=2 and t=3:

(6) $QUALITY_t = b_0 + d_1\ QUALITY_{t-1} + b1\ CHANGE_t + b_2\ GTE\_ONLY + b_3\ LOC\_QUAL_t + e_{1t}$,

(7) $LOC\_QUAL_t = g_0 + g_1\ FSTATIC_t + g_2\ FDIAL_t + g_3\ FCONNECT_t + g_4\ FCUTOFF_t + e_{2t}$

Note that if $d_1 = 1$ in (6), then we are essentially modeling difference scores. In these equations, we assume that e_{it} and $e_{i,t+1}$, i=1,2, are independent, but that e_{1t} and e_{2t} may not be, so that instrumental variables and two-stage least squares must be used to avoid inconsistent estimates of our regression coefficients. See Johnston (1972) for technical details. The results of a preliminary model fitting are described below. The regression equations are given elsewhere (Drew and Bolton, 1989.)

COMPLETING THE LOOP: CONSEQUENCES OF THE ANALYSES

From our model fitting, we notice the following major items:

1. The model in equations (6) and (7) are applicable to both treated and control locations, for there are no main effects or interactions associated with a treatment versus control indicator.
2. Simple differences in QUALITY are not appropriate for measuring change, as the coefficient d_1 in equation (6) is much smaller than 1.0.
3. The lagged value of QUALITY is an important predictor of current overall quality, although more so in the third wave than the second. (Perhaps change overrides memory.)
4. Even with the difference in equations, the effect of LOC_QUAL is nearly the same in the change model (equations 6 and 7) as in the cross-sectional model.
5. Having had previous service from another supplier (GTE_ONLY) is important only for the equation bracketing the original construction. The model from that period indicates greater rating increases among those having previous supplier experience. Wave 2 to wave 3 ratings are not affected by the experience.
6. The local call quality equation is dominated by FSTATIC, as in the cross-sectional model, and the effect of static experience is about the same as in that study.
7. The evaluation of current performance (LOC_QUAL) is more important in the equations than the disconfirmation measures, although the latter are significant at fairly high levels. Therefore, the long-term effect of performance evaluation is more important than the relatively transitory effect of disconfirmation.

With the construction of the attitude change model of the previous section, it is possible to begin to explain the surprising comparative changes in QUALITY for treated vs. control areas over the three survey waves. First, we have seen that simple QUALITY differences are not necessarily the most appropriate way to model change. The one variable paralleling the anticipated treatment vs. control pattern is CHANGE, which is in fact a significant input to QUALITY. However, the statistics FSTATIC and LOC_QUAL are even more important QUALITY determinants, and show the effects of substantial service disruption in the treated areas, with the percentage of those experiencing static increasing by around 5 and 2.5 percentage points in the treated areas from wave 1 to 2, while decreasing in the control areas. This is reflected n the LOC_QUAL means, which show a drop in the treated areas from wave 1 to 2, followed by a rise from wave 2 to 3 as static experiences decrease in extent. QUALITY ratings almost exactly parallel this movement.

We have seen that the mechanism by which customers modify their attitudes in the face of service change is somewhat different from that predicted by the cross-sectional model. From an operational view, however, one common aspect of these models is vital: current performance ratings (LOC_QUAL or FSTATIC) are extremely important. The service provider therefore must know the effect of his service improvements on measures of current performance in order to see his work reflected in QUALITY ratings. However, it is not simple to implement network improvements that will unequivocally decrease perceptions of such problems as noisy transmission. The process is complicated by long construction periods during which numerous idiosyncratic conditions are encountered. It is almost inevitable that some service disruption will result, and in accord with our attitude change models, will affect perceptions and ratings for some time.

Consequences for the Survey Process

Our experiments suggested several types of issues whose exploration would improve the confidence a company manager should.have in the results. As we saw above, the effect of the improvements was not simply to increase QUALITY ratings in the treated areas while ratings stayed constant in the controls. Ratings were surprisingly volatile, even within the same person over time, and the current practice of collapsing response categories (treating "Good" and "Excellent" as a single category) was shown to obscure important differences.

A different concern was revealed by a latent class model that was constructed to test for the classic concept of nonattitudes (Converse, 1964) in the QUALITY variable. Through this model, we find that 77% of our subjects had their pairs of responses fall in the independence/nonattitude class. Furthermore, in a confirmation of the classic supposition that extreme attitudes tend to be virtually fixed over time, most of the Excellent and Below Good responses fell in their

respective consistent response classes. These two results cast some doubt on the validity of the QUALITY measure, particularly when the response is "Good."

Organizational Consequences

Much of the impact of this experiment is still being absorbed by the company, and the use of its results for future plans in the service feedback loop are under discussion. A broad spectrum of trends and possible uses are, however, becoming clear. As a potential standard for plant improvement, this process was carefully scrutinized. Since our results confirmed the importance of static and connection problems in customer ratings, and showed that the customer's perception of improvement drives overall ratings, the process was seen as a good one to continue implementing. However, special care during the construction period was seen as crucial, partly since increased static leads to decreased ratings, and partly because poor ratings in one period carry over into later periods. Furthermore, it was noted that construction should be accompanied by some visible evidence of change, to enhance the customer's perception of improved service.

Another class of consequences concerns the survey process. This exercise has led to increased management awareness that customer attitudes are not manipulated as easily as physical measures, and that future tests need not dramatically increase customer ratings to be considered successes. It is now understood that QUALITY ratings (and certainly their Good/Excellent simplifications) should not be used as the sole basis for determining treatment effect. Future tests of service enhancements will use, whenever possible, the panel design with pre- and post-controls and retrospective questionnaire items employed for this test. In fact, this experiment has furnished valuable information by which to design a panel component for the basic customer survey of which the experiment's survey is an abridgement.

SUMMARY

In striving for higher quality in telephone service, cross-sectional customer satisfaction surveys are taken periodically, based on which regression models indicate service attributes which appear to be potentially satisfaction-increasing. This is the first step in a satisfaction feedback loop. In the next stage, service improvement programs are devised to increase satisfaction with the identified attributes, and the efficacy of the program is evaluated through a controlled field, or quasi-experiment. In the previous sections, we illustrated this kind of loop for the attribute of transmission quality in local telephone lines. Some of the more general findings from these experiments, their analysis and aftermath, are summarized below.

1. As evidenced by the greater importance of static on local call quality ratings immediately after our construction, it appears that attitude change over the actual service change period may depend on disrupted service attributes more than in periods of no change.
2. Both the preliminary cross-sectional models and the panel-based models from the quasi-experiment indicate nearly identical effects of the main service attribute (LOC_QUAL) on QUALITY ratings, despite the great differences between the interpretation of predictions in the two situations.
3. Manipulating the inputs to either model, that is, implementing service changes that will change customer perceptions in a predictable way, is not easy, and for complex, extensive changes may be very difficult. Customer memory of service disruptions may complicate the manipulation.
4. Disconfirmation (as manifested by CHANGE$_2$) plays a large part in influencing attitude change. However, attitude change is even more strongly affected by the longer-term effects of current performance ratings.
5. The disconfirming effect of experience with parallel suppliers is important when the rated service is sub-par. Its effect is negligible for comparable service levels.
6. Unexpected survey results may have the therapeutic effect of focusing attention on the survey process itself, and may result in a stronger, more defensible data collection prct.
7. Even survey items with high face validity (like QUALITY) may not reflect strong attitudes. Uncovering weakly-held, or non-attitudes requires careful analysis.

An extensive, periodic customer satisfaction program can have many benefits for a service company: service evaluation, problem detection, staff assessment and others. When the information gathered in support of these short-term goals is used as the first step of a strategic feedback loop, and the analysis is followed by candidate service programs and special survey experiments to test these actions, the loop and the survey program become very powerful corporate tools indeed.

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