

Linking Customer Satisfaction To Service Operations and Outcomes

Ruth N. Bolton
GTE Laboratories Incorporated
40 Sylvan Road
Waltham, MA 02254
617-466-2466
FAX: 617-890-9320

James H. Drew
GTE Laboratories Incorporated
40 Sylvan Road
Waltham, MA 02254
617-466-2894
FAX: 617-890-9320

Running Head: Linking Customer Satisfaction

Published In: Bolton, Ruth N. and James H. Drew "Linking Customer Satisfaction to Service Operations and Outcomes" (with James H. Drew), in Roland T. Rust and Richard L. Oliver (Eds.), Service Quality: New Directions in Theory and Practice, 1994, Chapter 8, Newbury Park, CA: Sage Publications, Inc., 173-200.

Linking Customer Satisfaction

Abstract

Organizations have traditionally managed services by manipulating engineering and operational attributes and observing market outcomes. In recent years, customer satisfaction ratings have become an important component in this process. Hence, managers are keenly interested in the effect of service changes on customer satisfaction, customer behavior and revenues. This chapter develops a framework that describes the theoretical relationships among service operations, customer assessments and market outcomes. It also discusses the methodological and managerial issues that tend to arise during an investigation of these relationships. Then, three case studies are described: a model of aggregate customer complaint behavior, a model of perceived service quality and a model of customer satisfaction with a specific service encounter. They are used to illustrate how the effects of service changes can be examined by estimating statistical models based on company records and survey data. The advantages and disadvantages of different approaches are outlined.

Linking Customer Satisfaction

Organizations have traditionally managed service delivery processes by manipulating "objective" features that are typically measured by engineering or operational records, such as the answer time of customer service representatives, repair clearing intervals, minutes of system down time, or noise metallic readings on telephone cables. These measures share one characteristic in common; they are calculated by machinery and staff situated within the organization. As such, they can be described as "internal" measures of the service delivery process. This nomenclature distinguishes them from "external" measures that originate from customers, such as satisfaction or complaint data, purchase transactions, sales volume and revenues.

Initial customer satisfaction efforts by many service organizations tend to focus on tracking customer survey ratings over time or benchmarking them against competitors' ratings. Customer satisfaction ratings become -- in effect -- a goal in their own right. However, when organizations attempt to incorporate the "voice of the customer" into the service delivery process, they quickly discover a need for diagnostic information that predicts how service changes will affect customer satisfaction, revenues and profits. Customer satisfaction ratings become one element in a loop that links service operations and outcomes. (See Figure 1). Consequently, organizations become interested in the relationship between service operations -- primarily characterized by internal measures -- and market outcomes -- primarily characterized by external measures.

Figure 1 here

Managers become interested in the relationships between internal and external measures because they would like to: (1) predict how service changes will affect customer satisfaction and (ultimately) revenues or profits (2) diagnose low customer ratings or (3) use customer ratings to evaluate the effectiveness of personnel and organizational units. For example, suppose a service organization surveys

Linking Customer Satisfaction

customers and finds that perceived waiting time has an important influence on customer satisfaction ratings (e.g., Clemmer & Schneider, 1989). The manager of a customer service center is likely to ask the following kinds of questions: Will a decrease in average answer time (i.e., the average number of times the telephone rings before a representative answers) decrease average perceived waiting time? If not, what will be the impact of altering other features of the service delivery process, such as the speed of the computerized order entry system? How will these changes affect customer satisfaction ratings, costs and revenues?

This chapter discusses how customer' assessments of services can be linked to service operations and outcomes. The first section develops a theoretical framework by addressing the following questions.

1. What are the key constructs that characterize customers' assessments of services?
2. What are the antecedents of customers' assessments of services?
3. How should key constructs, such as customer satisfaction and service quality, be measured?
4. What are the relationships among customer perceptions, customer dis/satisfaction, perceived service quality and value, customer purchase intentions and loyalty?
5. What are the linkages between service operations and customers' assessments of services?
6. What are the linkages between customers' assessments of services, purchase behavior and revenues?

The second section discusses how this theoretical framework can be applied to practical problems. Three case studies are described: a model of aggregate customer complaint behavior, a model of perceived service quality and a model of customer satisfaction with a specific service encounter. These examples illustrate how the links among customer assessments of services, service operations and outcomes can be investigated by estimating the statistical relationships among internal and external measures. The strengths and weaknesses of different approaches are discussed.

Theoretical Framework

Conceptualization of Customers' Assessments of Services

Linking Customer Satisfaction

Most research in services marketing has relied on two key constructs to characterize customers' assessments of services: customer satisfaction and perceived service quality. Research on customer satisfaction/dissatisfaction (CS/D) has focused on the customer's assessment of a specific transaction involving a product or service (Holbrook & Corfman, 1985; Olshavsky, 1985). In contrast, research on service quality has examined the customer's assessment of the overall excellence or superiority of a service (Zeithaml, 1988). However, CS/D and customer attitudes about services are intrinsically related. In a dynamic framework, the customer's satisfaction with a specific service encounter depends on pre-existing or contemporaneous attitudes about service quality (Anderson & Sullivan, 1992; Cronin & Taylor, 1992) and the customer's post-usage attitudes depend on satisfaction (Bitner, 1990; Bolton & Drew, 1992). These relationships have been explained by a variety of theories (Oliver, 1981; Inman & Dyer, 1992).

Perceived service value and purchase intentions are useful constructs to link customers' assessments of services to their purchase behavior -- and ultimately company revenues. Several studies find that consumer satisfaction is positively related to re-purchase intentions (e.g., Anderson & Sullivan, 1992; Bearden & Teel, 1983). Both Bitner's (1990) travel story experiment and Cronin and Taylor's (1992) survey research showed that service encounter satisfaction and perceived service quality are positively related to behavioral intentions. Bolton and Drew's (1992) study of small business customers indicated that perceived service value is positively related to behavioral intentions. LaBarbera and Mazursky's (1983) longitudinal study supports the role of satisfaction in influencing purchase intentions and behavior.

Application Issues. Companies typically link customer assessments to service operations and outcomes through programs that track average customer ratings on key survey questions over time. In this context, the conceptualization of the above constructs -- particularly the subtle distinction between CS/D and perceived service quality -- can be useful (if somewhat confusing) to managers. For example, since CS/D focuses on a specific transaction, customer satisfaction measures tend to be sensitive to service

Linking Customer Satisfaction

changes. Hence, if the goal of the program is to detect the effects of service improvements or failures in a timely fashion, managers should track customer satisfaction and its ingredients. (Managers have found control charts useful in tracking how company actions have impacted survey ratings.) In contrast, attitudes about service quality tend to change slowly over time (Bolton & Drew, 1991a). Hence, if the goal is to compare the performance of different organizational units -- where employee compensation or incentives may be tied to changes in results -- managers should probably track perceived service quality or a less volatile index.

Antecedents of Customers' Assessments of Services

CS/D is considered to be a function of disconfirmation arising from discrepancies between prior expectations and actual performance (Cardozo, 1965; Oliver, 1980; Olshavsky & Miller, 1972; Olson & Dover, 1976). Favorable disconfirmation (when performance exceeds expectations) can positively affect satisfaction. Expectations and perceptions of performance levels can affect CS/D directly, as well as indirectly via subjective disconfirmation (Tse & Wilton, 1988). Other antecedents of CS/D with products or services are customers' attributions about unexpected events (e.g., Folkes, 1984; Bitner, 1990), their perceptions about the fairness (i.e., equity) of the exchange process (e.g., Hupertz, Arenson & Evans, 1978; Oliver & DeSarbo, 1988; Oliver & Swan, 1989), mood or affect (e.g., Westbrook, 1987) and usage frequency and situation (Ram & Jung, 1991).

Oliver (1989) argues that there are at least five different consumption modes that give rise to satisfaction. Different affect descriptions are appropriate for different modes, and different antecedents operate for different modes. The latter notion is consistent with studies that indicate that expectations, performance evaluations and subjective disconfirmation do not necessarily have independent, additive effects for every product and service (e.g., Churchill & Surprenant, 1982). For example, customer expectations about continuing services, such as public utilities, may be passive.

Linking Customer Satisfaction

Parasuraman, Zeithaml & Berry (1985, 1988) conceptualized perceived service quality as a "gap," similar to disconfirmation, between expectations and perceptions of performance. In their framework, word of mouth communications, personal needs, past experience and external communications influence expectations or perceptions of performance; expectations and perceptions of performance indirectly affect perceived service quality via the gap. More recently, Cronin and Taylor's (1992) empirical work supports an attitude-based conceptualization of service quality in which perceived service quality depends on customers' perceptions of performance rather than the gap between perceptions and expectations about performance. They note that some models of service quality are primarily performance-based and are closely akin to conventional multi-attribute models (Wilkie & Pessemier, 1973).

Application Issues. Researchers do not entirely understand how various antecedents, such as expectations, affect customer assessments. Two common conceptualizations of expectations are normative expectations -- the customer's "ideal" for the evoked set -- and predictive expectations -- the customer's probabilistic assessment of the focal service's attributes. Although there is some agreement about the measurement of predictive expectations (e.g., Oliver, 1981), the measurement of normative expectations poses certain problems.

Since customers are likely to bring different frames of reference to different consumption situations, different (and multiple!) conceptualizations of expectations may be appropriate for different service contexts (e.g., Barbeau, 1985; Boulding, Staelin, Kaira & Zeithaml, 1992). Furthermore, Woodruff, Cadotte and Jenkins (1983) suggest that the customer's subjective disconfirmation may only operate when perceived performance lies outside a "zone of indifference." Attributions about "unexpected" service successes/failures might operate similarly. The observation that expectations are difficult to operationalize and that antecedents may be passive in certain consumption modes may explain why certain models of CS/D and service quality have been primarily performance based.

Linking Customer Satisfaction

Measurement of Key Constructs

Marketing's conceptualizations of CS/D and service quality critically affect their measurement. Survey items cannot distinguish between these two constructs simply by asking customers questions that include either the word "satisfaction" or "quality." In fact, certain conflicting empirical results can be reconciled by examining the different measures used in different studies.

Measures of CS/D should elicit the customer's evaluation of a specific transaction -- rather than eliciting a global evaluation of a service organization or process. In other words, the survey question should refer to the customer's specific, personal experience with a service. Since satisfaction is a summary psychological state that soon decays (Oliver, 1980), the timing of the measurement should be soon after the transaction. Since it is considered to be an evaluation of an emotional experience (Hunt, 1977), affective measures are appropriate. Researchers have used a variety of "satisfied/dissatisfied" scales. Westbrook (1980a) argues for a delighted/terrible scale. When multiple measures of CS/D are desirable, Likert or semantic differential scale items have higher reliabilities and convergent and discriminant validities than other satisfaction scales (Oliver, 1980; Westbrook & Oliver, 1981). Different scale items may be appropriate for different service contexts (Oliver, 1989).

Since perceived service quality is conceptualized as the customer's attitude about the excellence of a service, many researchers have relied on a single overall quality question with a poor/excellent scale. The identification of multiple measures of perceived service quality have been turned out to be more problematic. Parasuraman, Zeithaml and Berry (1988) suggested a multi-item scale called SERVQUAL, but the five underlying dimensions of service quality identified in their research have not been found in other service contexts (e.g., Cronin & Taylor, 1992). Since different service dimensions are relevant in different industries, it is incumbent upon the manager or researcher to develop multiple scale items to adequately capture a particular study context.

Linking Customer Satisfaction

Application Issues. Numerous practical issues beset field studies designed to link customer assessments to service operations and outcomes. Firstly, the design of a CS/D or service quality questionnaire must accommodate certain corporate realities. Managers control the engineering and operations attributes of the service delivery process, such as staffing and response speed; whereas customers' perceptions of service attributes are benefit-oriented, such as "courteous representatives" and "easy to do business with." Managers typically would like to be able to link attributes, such as the signal-to-noise ratio on a telephone line, to customers' perceptions of (say) sound quality. Since most companies are (as yet) unable to link engineering/operations attributes to customer perceptions of services through statistical models, managers tend to prefer survey items that reflect specific attributes. Hence, the wording of specific questions tends to reflect a compromise between language that is meaningful to customers and language that seems actionable to managers.

Secondly, the entire survey design must minimize total survey error (Assael & Keon, 1982). This goal entails obtaining cooperation from a representative sample of customers, maintaining respondent interest to elicit high quality responses, and so forth. Within the constraints imposed by the method of survey administration (mail, phone, personal interview) and the design (particularly length and structure) of the questionnaire, it may not be possible to obtain multiple measures of all key customer assessment constructs, perceptual ratings of relevant service process attributes and respondent classification information. As a result, it may be necessary to measure certain constructs with global measures or indices - and these can be difficult to operationalize.

Figure 2 here

Relationships Among Customer Assessments of Services

Marketing's theoretical models of customer assessments of services have become increasingly

Linking Customer Satisfaction

sophisticated. Figure 2 depicts the structural relationships described in the preceding paragraphs. This structural model is characterized by a system of relationships, with simultaneous linkages, including reciprocal causation. In particular, there seems to be a simultaneous relationship between CS/D with a service encounter and pre- and post-transaction attitudes about service quality. These causal links are difficult to trace except in rare, longitudinal studies. Hence, the relationship between CS/D and perceived service quality has yet to be completely resolved (Anderson & Sullivan, 1992; Bitner, 1990; Cronin & Taylor, 1992).

In general, there is an underlying tension between structural models of CS/D -- that tend to capture the richness of customers' cognitive processes -- and structural models of service quality -- that tend to reflect (via customer perceptions) a rich set of service attributes. Since these two constructs are related, reduced form models of CS/D and perceived service quality may appear to be very similar -- a frustrating situation for an empirical researcher. However, certain variables (e.g., perceptions of particular attributes) may affect CS/D, but not perceived quality, or vice versa. Furthermore, the coefficients (i.e., importance weights) of the predictor variables will certainly be different. Hence, although reduced form models of CS/D and perceived quality may be similar, they will not be identical.

The links between customer assessments of services, service operations and outcomes can be investigated by estimating the statistical relationships among internal and external measures. Although Figure 2 does not depict any measurement relationships, it does give some indication of the scope of the estimation problem. Since the model includes simultaneous structural relationships, simple estimation methods -- such as ordinary least squares -- may not be appropriate. If each construct has a single measure, simultaneous equation methods -- such as two stage least squares (Johnston, 1972) can be utilized (e.g., Bolton & Drew, 1991a, 1991b). If some constructs have multiple measures, path analysis (e.g., Bitner, 1990) or structural equation modeling (e.g., Cronin & Taylor, 1992) are suitable.

Linking Customer Satisfaction

Drew and Bolton (1991) have documented the existence of survey effects (e.g., question order) that can potentially confound the estimation of structural relationships. Since it is not always feasible to modify the survey structure to remove these effects, their results imply that the researcher must account for relatively complicated measurement relationships in order to obtain unbiased estimates of the structural parameters linking CS/D, perceived service quality and their antecedents or consequences. For example, when certain measures share common scales, it may be necessary to introduce a method factor(s) in Figure 2.

A final complication arises if the researcher believes that most measurement scales have ordinal rather than interval properties. In this circumstance, robust estimation methods that do not require strong distributional assumptions -- such as partial least squares (e.g., Fornell & Bookstein, 1982) may be preferred over maximum likelihood estimation of structural equation models (e.g., as embodied in LISREL). Alternatively, the researcher might consider transforming the data to better match distributional assumptions.

Links Between Service Attributes and Customers' Assessments

If managers desire to enhance customer satisfaction and service quality, they need to understand how service features affect customer assessments. The overall relationship between product/service features and affect is typically investigated using conjoint analysis (Green & Wind, 1975), quality function deployment (Hauser & Clausing, 1988), or other decompositional techniques. However, these techniques are more suitable for investigating new product/service design issues than for describing how complex features of an existing service delivery process affect customer assessments of service.

The linkage between service features and customer assessments of services can be considered a two stage process (Brunswick, 1952; Holbrook, 1981). "The first link in the chain represents the psychophysical relationships between product features and subjective attribute perceptions, whereas the second link

Linking Customer Satisfaction

represents the ... impact of attribute perceptions on affect" (Holbrook, 1981, p. 14). Numerous studies have used compositional techniques -- particularly multi-attribute attitude models -- to investigate the second link, namely how perceptions influence affect (e.g., Crosby & Stephens, 1987). In contrast, there are only a few studies that focus on the link between features and perceptions. They include research that relates service attributes to customers' perceptions of outpatient health services (Neslin, 1983), educational services (Chapman & Jackson, 1987), and so forth (e.g., Louviere, 1988), as well as research that relates product features to subjective perceptions (e.g., Hauser & Simmie, 1981; Narasimhan & Sen, 1990).

Different theories have been proposed to explain the influence of service features in terms of customer-employee (Solomon, Surprenant, Czepiel & Gutman, 1985) and customer-environment interactions (Bitner, 1992). Laboratory experiments have focused on constructs that mediate between service features and CS/D with service encounters, such as personalization strategies (Surprenant & Solomon, 1987) and perceived control (Hui & Bateson, 1991). Bolton and Drew (1991a) conducted a longitudinal analysis of a field experiment that directly related a change in service features (upgrading of plant and equipment) to customer perceptions and attitudes about service quality. In a survey-based approach, Bitner, Booms and Tetreault (1990) use the critical incident method to study how customers distinguish satisfactory/unsatisfactory service encounters.

Application Issues. Managers are frequently interested in how internal measures are related to customer perceptions. To estimate appropriate descriptive models, it is necessary to create a data base that "matches" company records concerning service features with customer survey data describing customers' perceptions and assessments of their service. Records can be matched at the level of the organizational unit (e.g., retail outlet) or at the level of the individual customer. The goals of the study will determine whether cross-sectional or time-series data are appropriate.

Ideally, company records should contain information at the individual customer level that is

Linking Customer Satisfaction

relevant to the customer's experiences. Unfortunately, internal measures are recorded for a variety of reasons: to satisfy government regulations, to evaluate employees, to facilitate production or accounting processes, and so forth. Hence, they may not be meaningfully related to customer concerns. In addition, the reporting period used in company records should match the customer's specific service encounters. In some service industries, such as financial services, the matching process is reasonably straightforward. In others, appropriate company records may not exist, or they may be virtually impossible to access.

The preceding discussion has assumed that operations affect customer assessments of services (attributes ---> assessments), but this causal flow can be reversed. Managers may respond to customer feedback by manipulating certain engineering or operational measures. For example, companies do not randomly allocate repair resources; they disproportionately allocate them to troubled areas. In this situation, conventional statistical analysis is inappropriate because the "natural" causal flow has been confounded by feedback effects (assessments ---> attributes). Simultaneous equation methods may be necessary to disentangle these reciprocal effects. Alternatively, controlled field experiments are a useful approach to investigating how internal measures are related to customer perceptions. An experimental manipulation of one or more features may be necessary when there is insufficient variation in the data or a confounding of service features,

Links Between Customers' Assessments and Service Outcomes

Companies are interested in enhancing customer satisfaction and service quality because they are convinced that (in the long run) these activities will lead to increased revenues and profits. This conviction is supported by a small number of studies that show that higher levels of customer satisfaction and quality are associated with market success (e.g., Buzzell & Gale, 1987, p. 107; Lele & Sheth 1987, p. 35-6). For example, in a recent study that combined national customer satisfaction survey with business performance data, Anderson, Fornell and Lehmann (1992) found that customer satisfaction and perceived quality have a

Linking Customer Satisfaction

positive impact on market share and profitability. In addition, customer satisfaction is related to industry characteristics.

Surprisingly, there are very few studies that relate individual customers' assessments of services to behavioral outcomes. A stream of research with the CS/D literature examines how satisfaction and attitudes are related to customer complaining behavior and (ultimately) retention rates (e.g., Bearden & Teel, 1983; Fornell & Wernerfelt, 1987; Halstead & Droge, 1991; Singh, 1988). However, studies that relate customer assessments to actual purchase behavior are rare. In a study of grocery products, LaBarbera and Mazursky (1983) found it difficult to predict repurchase behavior from CS/D variables without incorporating consumers' prior experience with the brand. Since customer satisfaction had a weak effect on behavior, they speculated that situational variables, such as coupons and promotions, were affecting the purchase decisions. In a services marketing context, Rust and Zahorik (1992) applied a mathematical framework that links customer perceptions, satisfaction, retention rates and market share in a study of banking customers.

Application Issues. There has been very little research that examines how individual customers' assessments are related to their behavior and (consequently) company revenues/profits. A variety of behavioral or market outcomes could be studied, including complaint behavior, purchase behavior, and customer loyalty. For example, it could be useful to investigate whether higher levels of perceived quality (as measured by customer survey data) are associated with savings because of decreases in rework and decreases in customers' invocations of guarantees and warranties. Since companies usually maintain purchase records, it should be possible to link internal measures of customer behaviors to external measures of CS/D and perceived quality using descriptive models. In addition, laboratory or field experiments -- similar to the aforementioned studies linking service operations to customer assessments -- could be used to study the relationship between customer assessments of services, their behaviors and company revenues. Unfortunately, services -- unlike products -- pose some unique problems. For example, many services, such

Linking Customer Satisfaction

as financial services and utilities, entail continuous relationships characterized by a variety of discrete service encounters.

Applications

Prior research has focused on the relationships among constructs that describe customers' assessments of services, particularly CS/D, perceived service quality and customer perceptions. This section describes three case studies of how customers' assessments of services were linked to service operations or outcomes. All three examples concern services provided by GTE Telephone Operations -- that is, local call provision, long distance access, operator services, customer services (e.g., installation, repair and service changes), and billing services.

Case Study # 1: An Model of Aggregate Customer Dissatisfaction

In the absence of a CS/D program, organizations can exploit company records to investigate how service operations affect customers' assessments of services. At a minimum, their investigation requires aggregate statistics based on internal measures of service attributes and outcomes. For example, the telephone company conducts physical tests of its lines and cables on a systematic basis. It records the percentage of lines passing/failing these tests each month in each geographic region. Due to Public Utilities Commission requirements, it also records the number of trouble reports by customers each month in each region.

Using these data, it is possible to model customer dissatisfaction -- described by an external measure, namely trouble reports -- as a function of service features -- described by internal records of line tests. The structural model can be described algebraically as follows:

$$\text{SATISFACTION} = f(\text{FEATURES}, \text{GEOGRAPHY}, \text{TREND}) \quad (1)$$

SATISFACTION is measured by TROUBLE reports per region per month. Service FEATURES are represented by a vector of two variables representing the percentage of telephone lines passing two different

Linking Customer Satisfaction

tests (TEST1 and TEST2). GEOGRAPHY differences are captured by dummy variables (STATE1 and STATE2) and any TREND over time is captured by an index variable that represents the month.

Using data describing trouble reports and telephone line tests for three states over a 24 month period (i.e., $n=72$), the company operationalized equation (1) as a linear additive model, estimated it with ordinary least squares and obtained the following results.

$$\begin{aligned} \text{TROUBLE} = & 32.17 + 2.56 \text{ STATE1} + 0.31 \text{ STATE2} - 26.92 \text{ TEST1} - 0.30 \text{ TEST2} \\ & -0.04 \text{ TREND.} \end{aligned} \quad (2)$$

As expected for an aggregate level analysis, the explanatory power of this equation is reasonably good; the R-Squared is 0.60. Each coefficient was different from zero and statistically significant ($p < .05$). The results indicate that (1) there are differences in the aggregate number of trouble reports across geographic regions; (2) trouble reports are substantially lower in states where telephone lines typically pass TEST1; (3) trouble reports are somewhat lower in where telephone lines typically pass TEST2; (4) trouble reports decreased slightly over time. Note that the implications for organizational action are relatively straightforward. Since CS/D is strongly related to the percentage of lines passing TEST1, managers should focus on improvements to telephone lines so that they meet TEST1 standards.

Discussion. From a managerial perspective, this model is simple, yet powerful. Nevertheless, it provokes as many questions as it answers due to several limitations. (1) The dependent variable is a relatively narrow measure of SATISFACTION, namely complaint behavior. (2) The independent variables consist of a limited number of service features that are potential dissatisfiers, rather than satisfiers. (3) Referring to Figure 2, it can be seen that equation (1) is a reduced form model that omits the mediating role of cognitive variables, such as customer perceptions and disconfirmation. Hence, the model can give little insight into customers' evaluative processes. (4) Each construct (e.g., satisfaction, service features) is measured by a single indicator. (5) Trouble reports can't be linked to outcome variables, such as revenues,

Linking Customer Satisfaction

so managers cannot conduct a cost-benefit analysis of potential telephone line improvements. (6) Despite the intriguing results shown above, aggregation may mask statistical relationships between constructs.

Case Study # 2: A Model of the Customer's Perceived Quality

Models based on individual level data overcome some of the aforementioned shortcomings. The second case study illustrates how individual level data can be used to develop a model of the perceived quality of local telephone service. Based on Figure 2, the model describes customers' post-usage evaluation of the overall QUALITY of telephone service as a function of their DIS/SATISFACTION with recent telephone service and their PERCEPTIONS of performance, after controlling for INDIVIDUAL differences. Algebraically,

$$\text{QUALITY} = g(\text{DIS/SATISFACTION}, \text{PERCEPTIONS}, \text{INDIVIDUAL}) \quad (3)$$

The telephone company obtained the data to operationalize this model by matching customers' records from three different sources. The telephone company routinely surveys a probability sample of its customers and asks them their perceptions of service attributes and their evaluation of overall quality. To operationalize equation (3), it matched survey data from 293 customers contacted during February 1988 with billing records and repair records. The billing records described each subscriber's purchase history: length of service, current and late or delinquent bill amounts, etc. The repair records described each subscriber's service history, including the date and nature of any service problems.

The dependent variable in equation (3), QUALITY, was measured with a question tracked by the survey questionnaire: "How would you rate the overall quality of services provided by your local telephone company? Would you say poor . . . excellent?" The independent variables were operationalized by the measures shown in Table 1. Note that many of the measures originate from the customer, although they are stored in the company's billing and repair records. Then, equation (3) was specified as a linear additive model and estimated with ordinary least squares. The R-Squared is 0.27 and the coefficient estimates are

Linking Customer Satisfaction

displayed in the last column of Table 1. (If the dependent variable is treated as nominal, rather than interval-scaled and equation (3) is estimated with logistic regression procedures, the results are substantially the same.)

Table 1 here

Consistent with prior research, the results show that customers' post-usage evaluations of overall quality depend on their satisfaction with recent service and their perceptions of performance attributes. Although perceptions of performance account for a large percentage of the explained variance, customer dis/satisfaction also plays a significant role -- accounting for 25% of the explained variance in perceived quality. Surprisingly, customers' perceptions of local service performance (LOCAL) seem to have a negative impact on perceived service quality. This result is explained by the fact that perceptions of local service were measured by an indicator variable that took on the value of one if the telephone line had not been reported out of service. Customers may not "blame" the telephone company for out-of-service trouble because the cause of the trouble is typically outside the company's control and the company is highly responsive to out-of-service problems so that the customer evaluates the repair outcome positively. These notions are consistent with current theories about customers' attributions concerning unexpected events.

Interestingly, the impact of reported and unreported trouble on perceived service quality is about the same. Unreported problems (e.g., static on the line, call blockages) tend to be less disruptive than reported problems (e.g., line out of service), but they are more difficult for the organization to correct. Hence, this result implies that the telephone company should consider allocating more resources to these less disruptive, but highly dissatisfying, service problems. In addition, as suggested by Fornell and Wernerfelt (1987), the company could encourage complaint behavior so that such service problems can be resolved.

Discussion. This example illustrates some of the advantages of individual level models utilizing

Linking Customer Satisfaction

internal and external measures. (1) The company gained considerable insights by estimating a structural model in which perceived quality depended on mediating cognitive variables, such as satisfaction and perceptions. As a result, it learned that customers seem to attach more weight to "minor" service problems than managers anticipated. (2) The results were considered actionable by managers because the cognitive variables were operationalized by attribute-specific measures. Customer dis/satisfaction was measured by trouble report records that managers could link directly to specific engineering or operational failures. (3) Internal and external measures are useful complements -- particularly when customers are unable to provide accurate information about certain aspects of the service delivery process, such as the nature of service problem.

There are also certain difficulties in developing individual models operationalized by internal and external measures. (1) Company records may not contain measures of certain constructs. In this example, billing records did not show itemized charges for specific services (e.g., local calls, custom calling services). Hence, it wasn't possible to model the link between purchase behavior and perceived service quality. (2) When external measures are required of key cognitive variables, surveys must be specially designed (or temporarily modified) to measure them. The survey questionnaire was primarily designed to measure customers' perceptions and perceived service quality (suitable for a multi-attribute model), rather than the cognitive antecedents of CS/D with a specific encounter. Consequently, there was no information available about customers' attributions concerning out-of-service problems. (3) Internal measures may not exactly correspond with theoretical constructs. In this study, customer dis/satisfaction was measured with three dichotomous indicators reflecting complaint behavior rather than the external measures suggested in the CS/D literature. (4) Like external measures, internal measures can be error prone. For example, repair center staff may code service problems incorrectly.

Case Study # 3: A Model of the Customer's Satisfaction with a Repair Encounter

Linking Customer Satisfaction

In this study, the telephone company created a very rich data base by matching external and internal measures that described a probability sample of repair service encounters in one operating region over a 13 month period (April 1990 - April 1991). External measures were obtained from a survey of residential telephone customers that had called the repair office in the past 30 days. These survey responses were matched with company records that described the repair problem (e.g., can't call out, can't hear), the cause (e.g., customer, company employee) and how it was resolved (e.g., repair to wall-jack) -- using over 50 specialized codes. The matching process yielded 1847 observations.

Based on Figure 2, customers' SATISFACTION with repair service is positively related to favorable perceptions of the company's performance of the repair, favorable subjective DISCONFIRMATION, and favorable ATTRIBUTIONS about events in the repair process. Research concerning service performance has focused on customers' perceptions of EMPLOYEE role performance, their perceptions of CONTROL and their perception of the company's personalization strategies. Hence, three types of perceptions of performance are represented separately in the structural model. Algebraically,

$$\text{SATISFACTION} = h (\text{EMPLOYEE, CONTROL, PERSONALIZATION,} \quad (4)$$

$$\text{DISCONFIRMATION, ATTRIBUTIONS })$$

where:

$$\text{CONTROL} = h_1 (\text{SERVICE ATTRIBUTES}) \quad (5)$$

$$\text{PERSONALIZATION} = h_2 (\text{SERVICE ATTRIBUTES}) \quad (6)$$

$$\text{ATTRIBUTIONS} = h_3 (\text{SERVICE ATTRIBUTES}). \quad (7)$$

Although it is desirable to estimate the complete structural model (equations 4-7), external measures of perceived control, perceived personalization and attributions were not available. Hence, a reduced form model was obtained by substituting equations (5)-(7) into equation (4) as follows.

$$\text{SATISFACTION} = j (\text{EMPLOYEE, DISCONFIRMATION, SERVICE ATTRIBUTES}). \quad (8)$$

Linking Customer Satisfaction

The dependent variable in equation (8), SATISFACTION, was measured with a question tracked by the repair survey: "Considering your repair service in total, that is, from the time the trouble was reported until now, how would you rate the way the repair was handled? Would you say poor . . . excellent?" The independent variables were operationalized by the external and internal measures shown in Table 2. For example, the customer's perceptions of different employees' PERFORMANCE were directly measured by survey ratings (CALL-REP, CENTER-REP and REPWORK). Dummy variables (CALL and CENTER) are used to capture differences between customer-employee encounters that took place over the telephone versus encounters that took place at a repair center. Unfavorable DISCONFIRMATION concerning the company's response time is measured by the number of REPEAT calls to the repair center; favorable disconfirmation is measured by the customer's report of whether the repair was done when promised (DONEPROM).

 Table 2 here

The remaining independent variables in equation (8) are selected by considering how perceived control, perceived personalization and attributions are related to service features. Customers' satisfaction is positively related to higher levels of perceived control (Hui & Bateson, 1991). In this study, perceived control of the repair process is considered to decrease with the company's response time, where the effect varies depending on the nature of the problem. For example, perceived control is likely to be low when the telephone is "dead" (because the customer can't call out) and repair times are slow. Thus, the customer's perceived CONTROL is represented by two interaction terms describing service attributes; these terms are created by multiplying a dummy variable indicating the nature of the service disruption by the actual amount of time that elapsed between when the problem was reported and when it was resolved (i.e., DEAD*TIME and OTHER*TIME). It is hypothesized that satisfaction levels will be negatively related to DEAD*TIME and OTHER*TIME. As discussed above, the absolute magnitude of the DEAD*TIME coefficient is likely to be larger than the other two coefficients.

Customers' satisfaction has been found to be positively related to higher levels of customized personalization (Surprenant & Solomon, 1987). In this study, customers' perceptions of the extent of customized personalization of the repair process were hypothesized to depend on whether a date/time was given when the trouble would be corrected and whether a repair person visited the premises. It was expected that perceived personalization would be higher when either of these attributes were present. These attributes were measured by customer reports (GIVETIME, VISIT), rather than internal measures. Hence, it is hypothesized that satisfaction will be positively related to GIVETIME and VISIT.

Lastly, customers' satisfaction has been shown to depend on their attributions about the locus of responsibility for the problem, whether the cause was perceived to be within the company's control, and

Linking Customer Satisfaction

whether the cause is likely to recur (e.g., Bitner, 1990). Satisfaction with the repair process is hypothesized to be higher when customers consider that they (rather than the company) are responsible for the problem (CUSTOMER). Unlike network or central office failures, physical equipment failures (e.g., customer premise equipment, jacks, telephone lines) are readily observable by the customer -- with the possibility of external explanations for the failure (e.g., weather, construction work). Hence, customers are likely to attribute less control to the company and to believe that the problem is rare. Hence, it is hypothesized that satisfaction will be higher for PHYSICAL causes than for other causes.

For estimation purposes, the dependent variable was treated as nominally scaled by recoding it to take the value one when the customer rated service as excellent and zero otherwise. The functional form of equation (8) was specified to be linear additive. Then, the model was estimated using logistic regression procedures (i.e., maximum likelihood estimation). The coefficient estimates are displayed in the last column of Table 2.

Managers can draw a rich set of implications from these results. As expected, satisfaction is positively related to perceptions about performance and disconfirmation. In fact, the impact of disconfirmation, as indicated by REPEAT calls to the repair office, is substantial. More notably, satisfaction decreases as repair time increases, where the magnitude of the effect depends on the nature of the repair problem. Graphs were used to illustrate to this notion to managers. (See Figure 3). For example, the percentage of customers giving excellent ratings is significantly lower when the telephone line is dead for an increasing periods of time -- probably due to lower levels of perceived control over the repair process. (As an aside, customers over-estimate actual repair times when the actual time exceeds 24 hours.) Satisfaction levels are also significantly higher when the repair is completed when promised and when it entails a visit to customer premises -- probably due to higher levels of perceived personalization of the repair process. Lastly, satisfaction levels vary depending on the locus of the responsibility for the problem

Linking Customer Satisfaction

and whether the problem was within the company's control (i.e., non-physical problems). In general, these results suggest that the telephone company could consider re-allocating resources depending on the nature of the service failure. For example, customization (e.g., making an appointment for the repair person's visit) might substitute for rapid response times when a visit to the customer's premises is required.

Figure 3 here

Discussion. The similarities and differences between case studies 2 and 3 illustrate some of the trade-offs researchers face in estimating individual level models with internal and external measures. (1) In case study # 2, the dependent variable is perceived quality of local telephone service; whereas, in case study # 3, the dependent variable is customer satisfaction with repair service. The differences between these two constructs lead to completely different model specifications and (consequently) inferences. (2) Case study # 3 utilized a reduced form model primarily based on service features instead of a structural model based on cognitive variables. The results suggest that there are significant effects due to the cognitive variables -- perceived control, perceived personalization, disconfirmation, attributions -- under field conditions. Hence, it is clearly important to measure these mediating variables. (3) Organizations frequently fail to measure key cognitive variables, such as customers' attributions concerning out-of-service problems. Their surveys are usually designed to measure perceptions of performance and CS/D or service quality. Managers prefer perceptual ratings over other cognitive variables because they are useful in evaluating the effectiveness of organizational units and personnel (often a primary goal of quality programs). Specially designed (or temporarily modified) surveys may be necessary to obtain external measures of key cognitive variables. (4) Since local telephone service is a continuously provided service in a regulated market, it is particularly difficult to identify suitable measures of market outcomes. Hence, the three case studies were unable to link customer assessments to behavior or revenues. As indicated by the paucity of prior research, the links

Linking Customer Satisfaction

between customer assessments, behavior and revenues are difficult to investigate for many other services as well. (5) Researchers are usually willing to assume that their measures have interval properties, but this assumption may not be appropriate. Although prior research has documented the existence of "satisfiers" and "dissatisfiers," few researchers have recognized the implications of this finding for statistical analyses -- namely, that it may be necessary to use estimation procedures that do not require interval properties. Note that case study # 3 did not assume that customers' ratings of "excellent" and "poor" repair service are a function of the same set of service features, with coefficients of the same magnitude.

Concluding Remarks

Managers are interested in predicting the effect of service changes on customer satisfaction, revenues and profits. Although market researchers have made substantial progress in understanding the theoretical relationships among customer assessments of services, other relationships are not well understood. For example, longitudinal -- rather than cross-sectional -- analyses are needed to examine the relationship between customer satisfaction, perceived service quality and behavioral outcomes. Descriptive studies or field experiments are needed to investigate how service features are linked to customer perceptions and cognitive variables.

There are numerous practical issues associated with designing field studies, such as implementing service changes under controlled conditions, fielding customer surveys with an appropriate domain of questionnaire items, matching customers' service experiences with appropriate company records describing the delivery process. In addition, as descriptive studies and field experiments address more sophisticated issues, the statistical issues become increasingly complex. Researchers have already begun to recognize the existence of simultaneous relationships among key constructs and to utilize multiple measures of key constructs. In the future, they will also have to account for the fact that internal and external measures may lack interval properties and that they are likely to be characterized by measurement error. However, it

Linking Customer Satisfaction

seems likely that design issues, rather than statistical issues, will prove more intractable.

There is also a critical need for comprehensive models of customer assessments, service operations and outcomes -- that is, models with multiple, structural equations that recognize potentially simultaneous relationships. By necessity, these models must be operationalized with measures of service operations and outcomes from within the organization. Unfortunately, many organizations do not systematically collect relevant internal measures. If they do, it can be very difficult to retrieve and match them at the individual level. Surprisingly, it can be equally difficult (but not infeasible) to measure certain cognitive variables within existing customer satisfaction or quality survey programs. As a result, special data collection efforts -- possibly combined with the experimental manipulation of service features -- are often required. As a result, field experiments are a particularly attractive approach to investigating how changes in service features affect customer assessments and market outcomes.

This chapter has described how company actions and outcomes are integral parts of a loop designed to improve customer satisfaction and/or perceived service quality. Many studies have explored isolated relations within this loop, but few -- if any -- have modeled the entire loop over one or more of its cycles. The description, monitoring and modeling of the entire loop would be a major advance in the study of customer satisfaction/quality management for services.

Linking Customer Satisfaction

References

- Anderson, E. W., Fornell, C. & Lehmann, D. R., (1992). Perceived quality, customer satisfaction, market share and profitability: Evidence from the Swedish National Satisfaction Barometer. Working Paper, University of Michigan.
- Anderson, E. W. & Sullivan, M. (1992). The antecedents and consequences of customer satisfaction for firms. Marketing Science, [forthcoming].
- Assael, H. & Keon, J. (1982), "Nonsampling vs. sampling errors in survey research," Journal of Marketing, 45 (Spring), 114-123.
- Barbeau, J. B. (1985). Predictive and normative expectations in consumer satisfaction: A utilization of adaption and comparison Levels in a unified framework. In H. K. Hunt & R. L. Day (Eds.), Consumer Satisfaction, Dissatisfaction and Complaining Behavior. Foundation for the School of Business, Indiana University.
- Bearden, W. O., & Teel, J. E. (1983). Selected determinants of consumer satisfaction and complaint reports. Journal of Marketing Research, 20, 21-8.
- Bitner, M. J. (1990). Evaluating service encounters: The effects of physical surrounding and employee responses. Journal of Marketing, 54 (2), 69-82.
- Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. Journal of Marketing, 56 (2), 57-71.
- Bitner, M. J., Booms, B. M., & Tetreault, M. S. (1990). The service encounter: Diagnosing favorable and unfavorable incidents. Journal of Marketing, 54 (1), 71-84.
- Bolton, R. N., & Drew, J. H. (1991a). A longitudinal analysis of the impact of service changes on customer attitudes. Journal of Marketing, 55 (1), 1-9.
- Bolton, R. N., & Drew, J. H. (1991b). A multi-stage model of customers' assessments of service quality

Linking Customer Satisfaction

- and value. Journal of Consumer Research, 17, 375-84.
- Bolton, R. N., & Drew, J. H. (1992). Mitigating the effect of service encounters. Marketing Letters, 3 (1), 57-70.
- Boulding, W., Staelin, R., Kaira, A., & Zeithaml, V. A. (1992). A dynamic model of service quality: From expectations to behavioral intentions. Journal of Marketing Research (forthcoming).
- Brunswick, E. (1952). The Conceptual Framework of Psychology. Chicago: University of Chicago Press.
- Buzzell, R. D. & Gale, B. T. (1987). The PIMS principles. New York: Free Press.
- Cardozo, R. (1965). An experimental study of customer effort, expectation and satisfaction. Journal of Marketing Research, 2, 244-9.
- Chapman, R. G. & Jackson, R. (1978). College choice of academically able students: The influence of no-need financial aid and other factors. Research Monograph No. 10. New York: The College Entrance Examination Board.
- Churchill, Jr., G. A., & Surprenant, C. (1982). An investigation into the determinants of customer satisfaction. Journal of Marketing Research, 19, 491-504.
- Clemmer, E. C. & Schneider, B. (1989). Toward understanding and controlling customer dissatisfaction with waiting. (Working Paper 89-115). Cambridge, MA: Marketing Science Institute.
- Cronin, Jr., J. J., & Taylor, S. A. (1992). Measuring service quality: A reexamination and extension. Journal of Marketing, 56 (3), 55-68.
- Crosby, L. A. & Stephens, N. J. (1987). Effects of relationship marketing on satisfaction, retention and prices in the life insurance industry. Journal of Marketing Research, 24, 404-11.
- Drew, J. H. & Bolton, R. N. (1991). The structure of customer satisfaction: The effects of survey measurement. Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior, 4, 21-

31.

- Folkes, V. S. (1984). Consumer reactions to product failure: An attributional approach. Journal of Consumer Research, 10, 498-409.
- Fornell, C. & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit voice theory. Journal of Marketing Research, 19, 440-452.
- Fornell, C. & Wernerfelt, B. (1987). Defensive marketing strategy by customer complaint management. Journal of Marketing Research, 24, 337-46.
- Green, P. E. & Wind, Y. (1975). New way to measure consumers' judgments. Harvard Business Review, (July-August), 107-117.
- Halstead, D. & Droge, C. (1991). Consumer attitudes toward complaining and the prediction of multiple complaint responses. In R. H. Holman and M. R. Solomon (Eds.), Advances in Consumer Research, 18, Provo, UT: Association for Consumer Research, 210-216.
- Hauser, J. R. & Clausing, D. (1988). The house of quality. Harvard Business Review, (May-June), 63-73.
- Hauser, J. R. & Simmie, P. (1981). Profit maximizing perceptual positions: An integrated theory for the selection of product features and price. Management Science, 27 (1), 33-56.
- Holbrook, M. B. (1981). Integrating compositional and decompositional analyses to represent the intervening role of perceptions in evaluative judgments. Journal of Marketing Research, 18, 13-28.
- Holbrook, M. B. & Corfman, K. P. (1985). Quality and value in the consumption experience: Phaedrus rides again. In J. Jacoby & J. Olson (Eds.), Perceived Quality, Lexington, MA: Lexington Books, 31-57.
- Hui, M. K. and Bateson, J. E. G. (1991). Perceived control and the effects of crowding and consumer choice on the service experience. Journal of Consumer Research, 18, 174-184.

Linking Customer Satisfaction

- Hunt, H. K. (1977). CS/D -- Overview and future research directions. In H. K. Hunt (Ed.), Conceptualization and Measurement of Customer Satisfaction and Dissatisfaction. Cambridge, MA: Marketing Science Institute.
- Hupertz, J. W., Arenson, S. J. & Evans, R. H. (1978). An application of equity theory to buyer-seller exchange situations. Journal of Marketing Research, 15, 250-60.
- Inman, J. J. & Dyer, J. S. (1992). An Extended Paradigm of Consumer Satisfaction Based on Generalized Utility Theory. Working Paper, University of Southern California.
- Johnston, J. (1972). Econometric Methods. New York: McGraw-Hill Book Company.
- LaBarbera, P. A. & Mazursky, D. (1983). A longitudinal assessment of consumer satisfaction/dissatisfaction: The dynamic aspect of the cognitive process. The Journal of Marketing Research, 20, 393-404.
- Lele, M. M. & Sheth, J. N. (1987). The customer is key. New York: John Wiley and Sons.
- Louviere, J. J. (1988), Analyzing decision making: Metric conjoint analysis. Sage University Paper series on Quantitative Applications in the Social Sciences, 07-067. Beverly Hills: Sage Publications.
- Narasimhan, C. & Sen, S. (1990). Linking engineering attributes to perceptual characteristics. Working Paper, Washington University at St. Louis.
- Neslin, S. B. (1983). Designing new outpatient health services: Linking service features to subjective consumer perceptions. Journal of Health Care Marketing, 3 (Summer), 8-21.
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. Journal of Marketing Research, 42, 460-9.
- Oliver, R. L. (1981). Measurement and evaluation of satisfaction processes in retail settings. Journal of Retailing, 57 (Fall), 25-48.

Linking Customer Satisfaction

- Oliver, R. L. (1989). Processing of the satisfaction response in consumption: A Suggested Framework and research propositions. Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior, 2, 1-16.
- Oliver, R. L. & DeSarbo, W. S. (1988). Response determinants in satisfaction judgments. Journal of Consumer Research, 14, 495-507.
- Oliver, R. L. & Swan, J. E. (1989). Equity and disconfirmation perceptions as influences on merchant and product satisfaction. Journal of Consumer Research, 16, 372-383.
- Olshavsky, R. W. (1985). Perceived quality in consumer decision making: An integrated theoretical perspective. In J. Jacoby & J. Olson (Eds.), Perceived Quality, Lexington, MA: Lexington Books.
- Olshavsky, R. W. & Miller, J. A. (1972). Consumer expectations, product performance and perceived product quality. Journal of Marketing Research, 9, 19-21.
- Olson, J. C. & Dover, P. (1976). Effects of expectations, product performance, and disconfirmation on belief elements of cognitive structures. In B. B. Anderson (Ed.), Advances in Consumer Research (4). Chicago: Association for Consumer Research.
- Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. Journal of Marketing, 49 (4): 41-50.
- Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1988). SERVQUAL: A multiple item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64 (1), 12-37.
- Ram, S. & Jung, H. S., (1991). How product usage influences customer satisfaction. Marketing Letters, 2, 403-11.
- Rust, R. T. & Zahorik, A. J. (1992). The value of customer satisfaction, Working Paper, Vanderbilt University.
- Singh, J. (1988). Consumer complaint intentions and behavior: Definitional and taxonomical issues.

- Journal of Marketing, 52 (1), 93-107.
- Solomon, M. R., Surprenant, C., Czepiel, J. A., & Gutman, E. G. (1985). A role theory perspective on dyadic interactions: The service encounter. Journal of Marketing, 49 (1), 99-111.
- Surprenant, C. F. & Solomon, M. R. (1987). Predictability and personalization in the service encounter. Journal of Marketing, 51 (2), 86-96.
- Tse, D. K. & Wilton, P. C. (1988). Models of consumer satisfaction formation: An extension. Journal of Marketing Research, 25, 204-12.
- Westbrook, R. A. (1980a). Intrapersonal affective influences on consumer satisfaction with products. Journal of Consumer Research, 7, 49-54.
- Westbrook, R. A. (1980b). A rating scale for measuring product/service satisfaction. Journal of Marketing, 44 (4), 68-72.
- Westbrook, R. A. (1987). Product/consumption-based affective responses and postpurchase processes. Journal of Marketing Research, 24, 258-70.
- Westbrook, R. A. & Oliver, R. L. (1981). Developing better measures of consumer satisfaction: Some preliminary results. In Kent B. Monroe (Ed.), Advances in Consumer Research (8). Ann Arbor, MI: Association for Consumer Research, 94-99.
- Wilkie, W. L. & Pessemier, E. A. (1973). Issues in marketing's use of multi-attribute attitude models. Journal of Marketing Research, 10, 428-41.
- Woodruff, R. B., Cadotte, E. R. & Jenkins, R. L. (1983). Modeling consumer satisfaction processes using experienced based norms. Journal of Marketing Research, 20, 296-304.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality and value: A means-end model and synthesis of evidence. Journal of Marketing, 52 (3), 2-22.

Linking Customer Satisfaction

Table 1

Operationalization of a Model of the Customer's Perceived Quality

Construct	Measures	Coefficient
DIS/SATISFACTION	REPORTED: Trouble reported by the customer within the past 90 days (Dichotomous variable, YES=1)	-0.38 ***
	UNREPORTED: Trouble recalled, but not reported, by the customer within the past 90 days (Dichotomous variable, YES=1)	-0.32 ***
	REPORTED90: Trouble reported by the customer more than 90 days ago (Dichotomous variable, YES=1)	0.26 **
PERCEPTIONS	LOCAL: Customer report of whether the telephone line was out-of-service (Dichotomous variable, NO=1)	-0.42 ***
	LONG: Customer rating of long distance telephone service (POOR=1, . . . , EXCELLENT=4)	0.37 ***
	BILL: Customer rating of billing service (POOR=1, EXCELLENT=4)	0.20 **
INDIVIDUAL	REVIEW: Customer report of whether he/she pays or reviews the bill (Dichotomous variable, YES=1)	0.49 **

table continues

Linking Customer Satisfaction

	LENGTH: Indicator of whether customer has had service for more than 15 years (Dichotomous variable, YES=1)	-0.10
--	--	-------

Notes: *** $p < .001$ ** $p < .05$ * $p < .15$. Intercept = 2.30.

table continues

Linking Customer Satisfaction

Table 2

Operationalization of a Model of the Customer's Satisfaction with a Repair Encounter

Construct	Measure	Coefficient
EMPLOYEE	CALL: Customer's report of whether he/she telephoned the repair center (YES=1).	-4.0134***
	CALL-REP: Customer's rating of the service received when he/she reported the problem over the telephone (POOR=1, EXCELLENT=4).	+1.1204***
	CENTER: Customer's report of whether he visited the repair center (YES=1)	-5.6556***
	CENTER-REP: Customer's rating of the service received when he/she reported the problem at the repair center (POOR=1, . . . , EXCELLENT=4)	+1.6106**
	REWORK: Customer's rating of the repair work that took place after he/she reported the problem (POOR=1, . . . , EXCELLENT=4)	+1.9661***
CONTROL	DEAD*TIME: Repair trouble code indicating that the telephone line was dead (YES=1) multiplied by repair time (in hours)	-0.0113 **
	OTHER*TIME: Repair trouble code indicating any	-0.0048

table continues

Linking Customer Satisfaction

	other problem, such as noise on the line (YES=1), multiplied by repair time (in hours)	
PERSONALIZATION	GIVETIME: Customer report of whether he/she was told a date or time when the trouble would be corrected (Dichotomous variable, YES=1)	-0.0760
	VISIT: Customer report of whether a repair person visited the premises (Dichotomous variable, YES=1)	+0.3473***
DISCONFIRMATION	REPEAT: Company records of the number of times the customer contacted the repair office about the problem	-0.3266***
	DONEPROM: Customer report of whether the work was completed when promised (Dichotomous variable, YES=1)	+0.5427***
ATTRIBUTION	CUSTOMER: Repair cause code indicating that the problem was due to the customer, such customer leaving the handset off the hook (YES=1)	+0.6169*
	PHYSICAL: Repair trouble code indicating that the problem was physical and (consequently) might be observed by the customer (YES=1)	+0.4550**

Notes: *** p < .001 ** p < .05 * p < .15. Intercept = -6.7274.

table continues

Figure Caption

Figure 1. Customer satisfaction loop.

Figure Caption

Figure 2. Links among customer assessments, service operations and outcomes.

Figure Caption

Figure 3. Satisfaction ratings as a function of the nature of the repair problem and the repair time.