

The Market Share Impact of Service Failures

Julie M. Hays

and

Arthur V. Hill

Curtis L. Carlson School of Management
University of Minnesota
321 19-th Avenue South -- Room 3-140
Minneapolis, MN 55455
USA

September 25, 1998

Corresponding author:

Professor Arthur V. Hill
612-624-4015 (voice)
612-626-8328 (fax)
ahill@csom.umn.edu

Acknowledgements:

This research was supported by grants from the National Science Foundation Transformations to Quality Organizations (Grant SBR-9811047), Radisson Hotels Worldwide, the Juran Center for Leadership in Quality at the University of Minnesota, and the Institute for Management Development in Lausanne, Switzerland. The authors thank Professors Ross Azevedo, Norm Chervany, John Dickhaut, Ken Roering, and Allen Shocker of the Carlson School of Management at the University of Minnesota for their helpful comments. The authors also thank the special issue editor and reviewers for several helpful comments.

The Market Share Impact of Service Failures

Abstract

This paper develops a simple but powerful model that relates service satisfaction/dissatisfaction to market share. The model is based on an intuitive Service Satisfaction Framework that relates three service system parameters (service success rate, complaint rate, and service recovery rate) to the percent of satisfied customers. Based on this static Service Satisfaction Framework, a dynamic model is posited that relates the defection rate to the percent of dissatisfied customers and the addition rate to the impact of word-of-mouth communications on the non-customer population. The Service Satisfaction/Market Share Model is defined for the equilibrium market share assuming no competitive response. The Service Satisfaction/Market Share Model yields useful insights into how market share is influenced by these three service system parameters. The surprisingly simple model predicts changes in market share due to changes in customer satisfaction based on only one parameter, which can be estimated from information readily available in most firms.

1. Introduction

Customer satisfaction and service quality are important determinants of both market share and profitability in many markets (Phillips, Chang, & Buzzell, 1983; Buzzell & Gale, 1987; Capon, Farley, & Hoenig, 1990). Cronin and Taylor (1992) assert that “There even appears to be executive consensus in the United States that service quality is one of the most important problems facing management today.” The importance of customer satisfaction and service quality in service industries is quite clear (Sasser, Olson, & Wycoff 1978; Oh & Parks, 1997). As manufacturing firms move to “just-in-time” manufacturing and “quick-response distribution” (Fisher, Hammond, Obermeyer, & Raman, 1994), customer satisfaction and service quality are becoming an increasingly important means of differentiation for manufacturing firms as well.

Many books and articles have focused on how firms can improve customer satisfaction (Zeithaml, Parasuraman, & Berry, 1990), service quality (Albrecht & Zemke, 1985; Schmenner, 1995; Lovelock, 1994; Collier, 1994), and customer loyalty (Jones & Sasser, 1995; Reichheld, 1996). Customer loyalty models have been developed (Fay, 1994; Gerson, 1993) where assumptions about the lifetime income stream for a customer are used to determine how much revenue or profit is lost if a customer is lost, possibly for life, due to poor service quality and customer satisfaction.

Several authors have suggested that two of the key management control parameters for improving customer satisfaction are the percent of customer complaints voiced to the firm (Fornell & Wernerfelt, 1987; Sampson, 1996) and the percent of customers recovered after they experience service problems (Kordupleski, Rust, & Zahorik, 1993; Reichheld & Sasser, 1990; Hart, 1993). Customers who experience a service failure cannot be recovered (restored to a good

relationship with the firm) if the firm is not aware of the service failure. Customers who are not recovered are more likely to “defect” (switch to the competition) and “infect” other customers and potential customers with bad reports that negatively influence future market share.

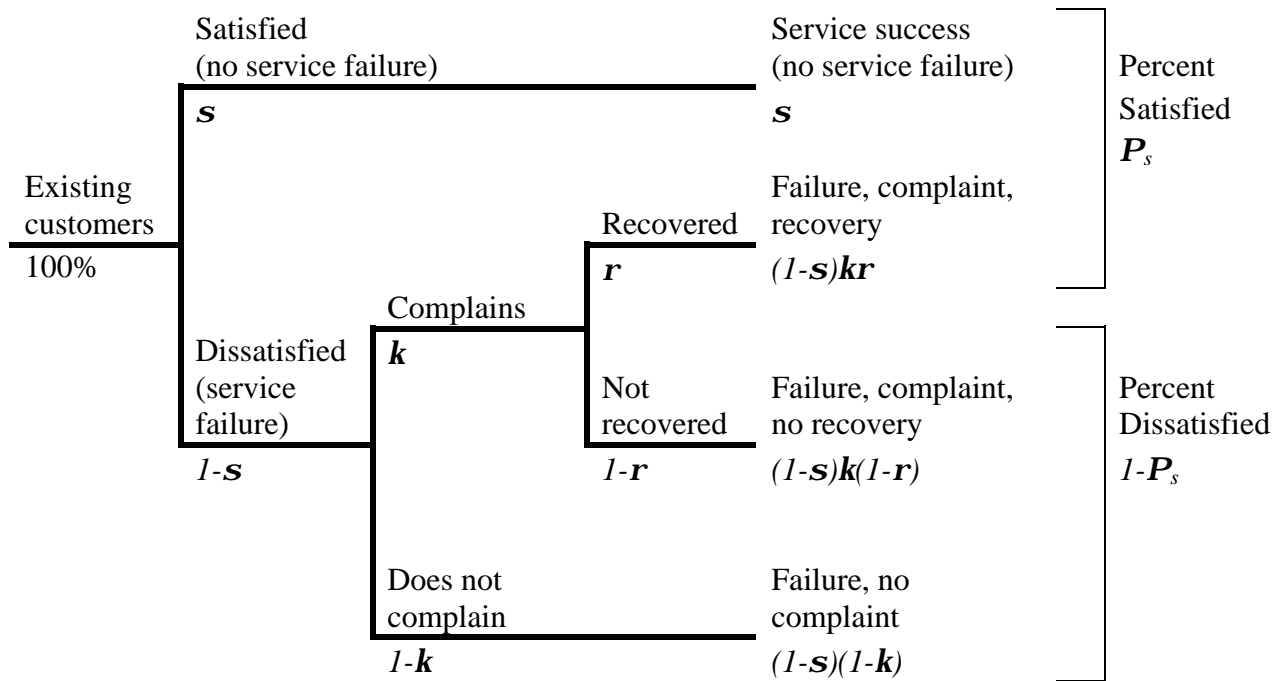
This paper presents a Service Satisfaction Framework that relates three service system parameters (service success rate, complaint rate, and recovery rate) to customer satisfaction and dissatisfaction. This static framework is then extended to an intuitive dynamic model that reflects how satisfied and dissatisfied customers affect market share over time. The Service Satisfaction/Market Share Model which relates customer satisfaction to market share is derived from the equilibrium condition for this dynamic model.

This paper is organized as follows. Section 2 presents the Service Satisfaction Framework and a review of the relevant literature. Section 3 presents the Service Satisfaction/Market Share Model along with graphs and sensitivity analysis. Section 4 discusses implementation issues and presents a hypothetical example. Section 5 presents limitations and extensions and Section 6 concludes the paper.

2. The Service Satisfaction Framework

The Service Satisfaction Framework presented in Figure 1 unifies many of the concepts from the literature. This framework is similar to the “Problem Impact Tree” found in Rust, Subramanian, and Wells (1992). The figure shows that s percent of customers are satisfied and $(1-s)$ are dissatisfied. We define a service failure as a service encounter that results in a dissatisfied customer. Customer satisfaction (or dissatisfaction) is viewed as a transaction-specific evaluation of the specific service encounter, similar to Bolton and Drew (1991a; 1991b) and Zeithaml *et al.* (1988).

Figure 1. The Service Satisfaction Framework



The Service Satisfaction Framework shows that of the customers who are dissatisfied, k percent voice their complaints and $(1-k)$ percent do not. We define k as the complaint rate parameter. Many authors, including Fornell and Wernerfelt (1988), Hirschman (1970), and Hill (1995), have argued that increasing "voice" from complaining customers helps the firm to recover "at risk" customers and learn about opportunities for improvement so that service delivery systems can be improved. Therefore, the complaint rate parameter, k , is an important management control parameter for retaining customers and learning about opportunities for improving the service delivery system.

Of those who complain, r percent are recovered and $(1-r)$ percent are not. We define r as the recovery rate parameter. Customer loyalty is strongly influenced by how well the firm manages customer complaints (Rust, Subramanian, & Wells, 1992). Effectively resolving customer complaints can result in customers who are even more loyal than those consistently

satisfied with the firm's service (Bolton & Drew, 1992). The more negative a customer's perception of responsiveness to customer complaints, the more likely that individual is to engage in negative word-of-mouth (Richins, 1983; Blodgett, Wakefield, & Barnes, 1995) and/or exit (Singh, 1990). Many researchers and practitioners have argued that customer retention strategies such as complaint resolution are more cost effective than attracting new customers (Reichheld & Sasser, 1990; Ittner & Larcker, 1996, Zemke & Bell, 1989, 1990; Bell & Zemke, 1987; Hart, Heskett, & Sasser, 1990; Heskett, Sasser, & Hart, 1990; Reichheld & Sasser 1990). The recovery rate parameter, r , therefore, is an important management control parameter for improving customer retention.

Figure 1 shows that P_s percent of customers are satisfied and $(1-P_s)$ are not satisfied, where $P_s = s + (1-s)kr$, (1)

and

$$(1-P_s) = (1-s)k(1-r) + (1-s)(1-k) = (1-s)(1-kr) \quad (2)$$

Although this framework could be applied to tangible products as well as to services, it makes greater sense in a service context. Customer retention for tangible products is often dependent entirely on tangible product attributes, whereas, customer retention for services is often a matter of interpersonal relationships where recovery and “repentance” (Bottom, Gibson, Daniels, & Murnighan, 1996) are more important.

This Service Satisfaction Framework can support some simple analyses of customer retention economics (Rust *et al.*, 1992; Schlesinger & Heskett, 1991; Heskett, Jones, Loveman, Sasser, & Schlesinger, 1994). However, this simple and intuitive model is a static (one-period) model and only considers defections. If this model is applied over multiple periods, it implies that the firm's market share will go to zero as long as $P_s < 1$. The next section extends the model

to a dynamic context and considers “additions” as well as “defections.”

3. The Service Satisfaction/Market Share Model

In order to develop a dynamic model from the static framework above, we consider the fact that market share is influenced negatively not only by dissatisfied customers who defect, but also through the impact of their negative word-of-mouth on potential customers. Similarly, market share is influenced positively both by satisfied customers who do not defect and through the impact of their positive word-of-mouth on potential customers. The negative influence diminishes as the firm’s market share approaches zero and the positive influence diminishes as the firm’s market share approaches 100%.

We develop two intuitive models to reflect the defection rate and the addition rate in each period. Our Service Satisfaction/Market Share Model is then derived from the equilibrium condition for the defection and addition rate models.

Defection rate model

Clearly, dissatisfied customers are at risk of defecting to the competition (assuming that competition exists). Intuitively, it would seem that the number of customers who defect at the end of period t is proportional to the number of dissatisfied customers in period t . We posit, therefore, that $d(t)$, the defection rate at the end of period t , is:

$$d(t) = \mathbf{d}(1-\mathbf{P}_s)m(t) = \mathbf{d}[(1-\mathbf{s})(1-\mathbf{k}) + (1-\mathbf{s})\mathbf{k}(1-\mathbf{r})]m(t) \quad (3)$$

where $m(t)$ is the number of customers in period t and the defection parameter, \mathbf{d} , is in the range $(0,1)$. The defection parameter is the proportion of dissatisfied customers who defect in one period. A high defection parameter suggests very low switching costs; a low defection parameter indicates very loyal customers, very high switching costs, or a monopoly situation. The model

assumes that customer expectations, service delivery systems, and prices do not change and, therefore, do not affect the defection rate. This model is extended in a later section of the paper to consider how the defection rate is affected by customer satisfaction for competitors as well.

Addition rate model

The number of customers added at the end of period t is dependent on how positive and negative word-of-mouth from current customers influence the $M-m(t)$ potential customers in the market in period t . (M is defined as the market size measured in terms of number of customers who might purchase the service.) If all current customers are satisfied ($P_s=1$), word-of mouth is completely positive and the firm will add a percent of the $M-m(t)$ non-customers in the next period. When 100% of customers are dissatisfied, word-of-mouth is completely negative and the firm will add zero percent of the $M-m(t)$ non-customers in the next period. We posit, therefore, that $a(t)$, the number of customers added at the end of period t , is:

$$a(t) = a P_s [M-m(t)] = a [s + (1-s)kr][M-m(t)] \quad (4)$$

where the addition parameter, a , is in the range (0,1). In this model, the percent satisfied (P_s) reflects the character of the word-of-mouth messages being sent by the current customer population. A high value of P_s indicates a high percentage of positive word-of-mouth; a low value of P_s indicates a high percentage of negative word-of-mouth. The a parameter reflects the impact of these positive (and negative) messages on the switching behavior of the non-customer population in the market. This model is extended in a later section of the paper to consider how the addition rate is affected by customer satisfaction for competitors as well.

Market share equilibrium

The number of customers in period $t+1$ is then:

$$m(t+1) = m(t) + a(t) - d(t) \quad (5)$$

The firm's market share will reach an equilibrium when the addition rate equals the defection rate, $a(t) = d(t)$. Substituting from above, we find that:

$$\begin{aligned}
 a(t) = d(t) \quad & \mathbf{P} \quad \mathbf{a P}_s [M - m(t)] = \mathbf{d} (1 - \mathbf{P}_s) m(t) \\
 & \mathbf{P} \quad m(t)/M = 1/[1 + (\mathbf{d}/\mathbf{a})(1 - \mathbf{P}_s)/\mathbf{P}_s] \\
 & \mathbf{P} \quad \mathbf{P}_M = 1/(1 + \mathbf{b}R)
 \end{aligned} \tag{6}$$

where $\mathbf{P}_M = m(t)/M$ is the equilibrium market share, $\mathbf{b} = \mathbf{d}/\mathbf{a}$ is the ratio of the defection and addition parameters, and $R = (1 - \mathbf{P}_s)/\mathbf{P}_s$ is the Dissatisfaction/Satisfaction ratio which is equal to:

$$R = (1 - \mathbf{s})(1 - \mathbf{kr}) / [\mathbf{s} + (1 - \mathbf{s})\mathbf{kr}] \tag{7}$$

We now have a simple yet powerful model for relating changes in the three service system parameters in the Service Satisfaction Framework to changes in the equilibrium market share.

Interpretation and sensitivity analysis

The \mathbf{b} parameter reflects the sensitivity of the firm's market share to changes in customer satisfaction. Figures 2-5 show how the Dissatisfaction/Satisfaction ratio affects market share for a range of \mathbf{b} values. When $\mathbf{b} = 0.1$, the firm's market share is quite insensitive to R which suggests a near monopoly or at least a situation with a very high switching cost. The firm still has an 83% market share even when the ratio of dissatisfied to satisfied customers is $R = 2$ (i.e., 2/3 of customers are dissatisfied). When $\mathbf{b} = 1$, market share is more sensitive to R , but the firm still has a 33% market share when the ratio of dissatisfied to satisfied customers is $R = 2$. When $\mathbf{b} = 100$, market share is very sensitive to R , and the firm must have extremely good customer satisfaction ($R = .04$) to earn a 20% market share. High values of \mathbf{b} suggest a situation where the switching cost is low and customer satisfaction is very important to market share. As the Dissatisfaction/Satisfaction ratio, R , approaches infinity, market share approaches zero and as R approaches zero, market share approaches one.

Figure 2. Market share versus R for $b=0.1$

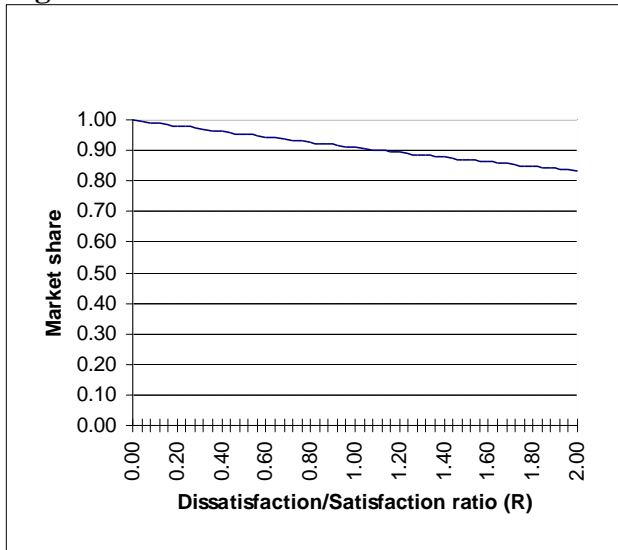


Figure 3. Market share versus R for $b=1$

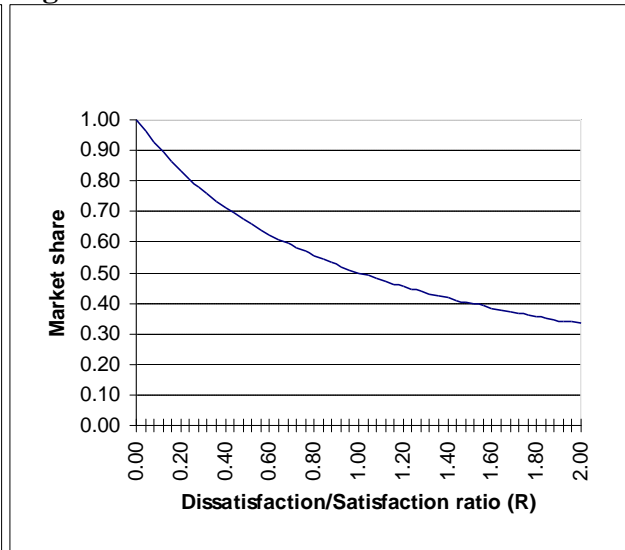


Figure 4. Market share versus R for $b=10$

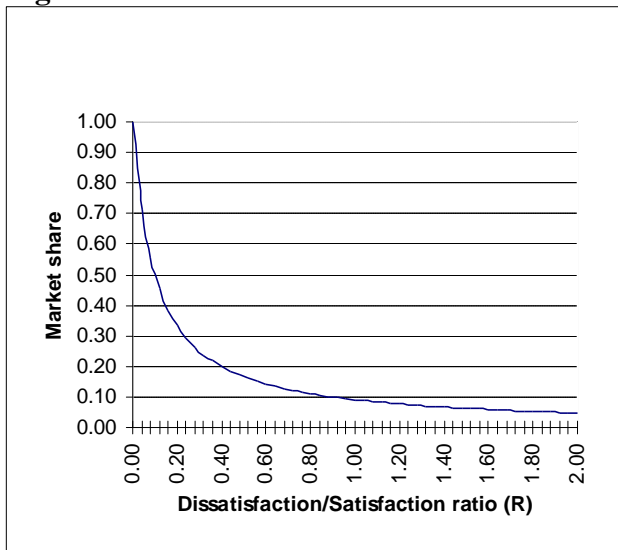
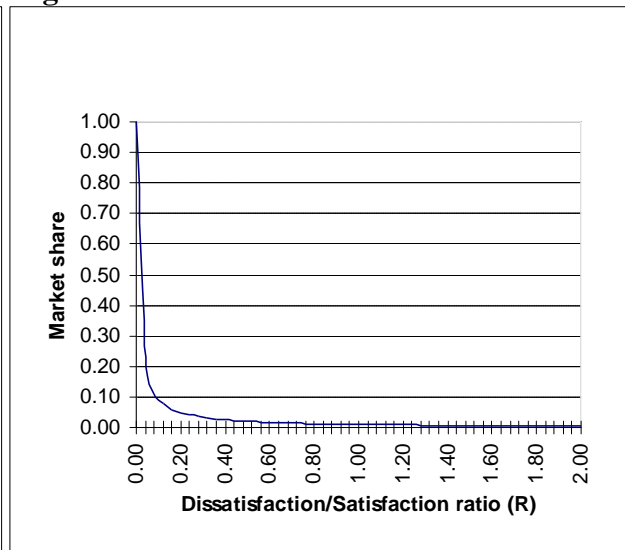


Figure 5. Market share versus R for $b=100$



It is interesting to note that the length of the period (i.e., weeks, months, quarters, etc.) is irrelevant to the model in equilibrium. Neither the addition parameter, a , nor the defection parameter, d , needs to be estimated; only their ratio $b=d/a$ needs to be estimated. As a ratio of the defection and addition parameters, b reflects the propensity for current customers to defect and/or potential customers to switch based on the firm's Dissatisfaction/Satisfaction ratio. The b parameter, therefore, captures much of the information about the willingness of customers (and

potential customers) to switch from (or to) the firm's service offering based on customer satisfaction. It is interesting to note that the Bolton and Drew (1991a, 1991b) model is also based on the ratio R (or R^{-1}). This implies that the ratio of the percent dissatisfied and satisfied is a more meaningful variable than the percent satisfied alone.

The partial derivatives of the market share with respect to each of the three service system parameters are:

$$\frac{\partial P_M}{\partial s} = \frac{b(1-kr)}{t^2} \quad (8)$$

$$\frac{\partial P_M}{\partial k} = \frac{b(1-s)r}{t^2} \quad (9)$$

$$\frac{\partial P_M}{\partial r} = \frac{b(1-s)k}{t^2} \quad (10)$$

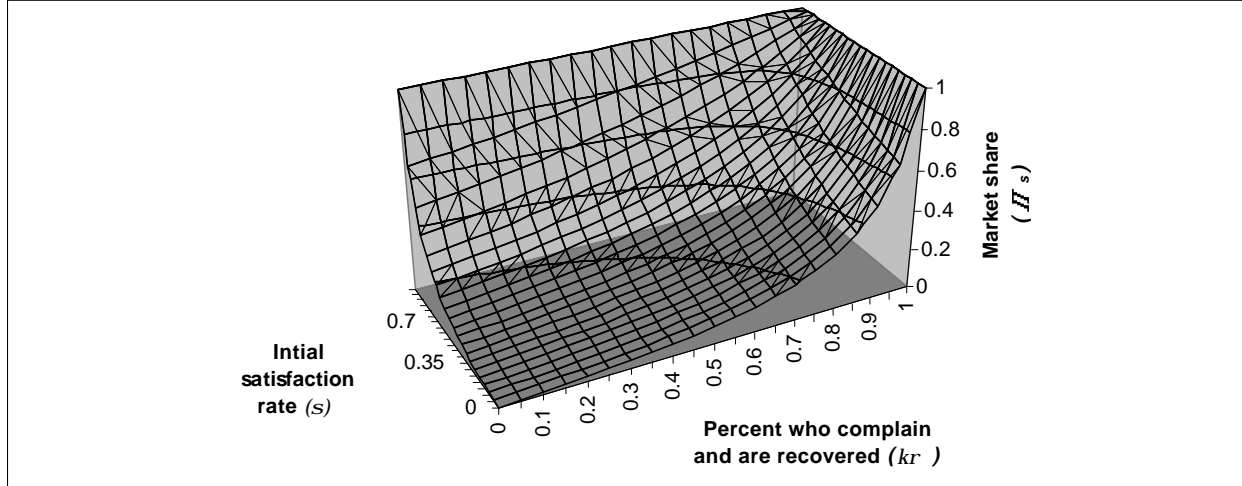
where $t = s + kr - krs + b - bkr - bs + bkrs$. Given that the partial derivatives are monotonically increasing with the three service system parameters, there are increasing returns to improving the parameters. The service system parameters interact strongly with each another, which suggests that improving more than one parameter at a time will have a synergistic effect on market share.

Given that market share (P_M) increases monotonically with each of the three service system parameters (s , k , and r), the optimal value for the parameters can only be found by considering the tradeoff between the costs of increasing the parameters and the economic benefits of corresponding increase in market share.

Figure 6 shows the response surface for the Service Satisfaction/Market Share Model as a function of s , the service success rate, and kr , the percent of customers who complain and are recovered. The figure shows that market share increases monotonically with both s and kr with increasing returns. Increasing the complaint rate increases market share just as much as a proportional increase in the service recovery rate. The symmetry between the two parameters

implies that increasing the complaint rate is just as important as increasing the recovery rate. (A different conclusion will be drawn later in the paper from an extension to this base model.)

Figure 6. The response surface for the Service Satisfaction/Market Share Model for $b = 10$



4. Implementation and example

Implementation issues

One surprising result of the Service Satisfaction/Market Share Model is that it has only one parameter, b , and one input variable, the Dissatisfaction/Satisfaction ratio, R . Given that most firms already know their market share P_M from industry data and their Dissatisfaction/Satisfaction ratio R from customer satisfaction surveys and market research, we rewrite the model to solve for the b parameter:

$$b = (1/P_M - 1)/R \quad (11)$$

Estimating b , therefore, does not require two data points and can easily be estimated from data readily available to the firm. Once b has been estimated, the Service Satisfaction/Market Share Model can be used to estimate a change in market share due to a change in any of the three service system parameters (s , k , and r), one at a time or in combination.

Hypothetical example

We illustrate the application of the model with a hypothetical example. From customer satisfaction survey data on a large number of customer transactions, a firm estimates that about 90% of its customers are satisfied ($P_s=.9$) with their service encounters. The Dissatisfaction/Satisfaction ratio, therefore, is $R=(1-.9)/.9=.111$. The firm currently has a 20% market share ($P_M = .2$) and we find from equation (11) that $b = 36$.

From customer satisfaction surveys, management estimates the firm's service success rate to be $s=.8$ and the service recovery rate to be $r=.8$. However, management is not sure what percent of complaints are being voiced. Fortunately, this can be computed from equation (1) which can be rewritten to show that $k = (P_s - s) / [(1 - s)r] = (.9 - .8) / [(1 - .9) \cdot .8] = .625$. In other words, only about 62.5% of customers are "voicing" their complaints to the firm. (The k parameter could also have been estimated from a market research study.)

Management believes that it can implement a new service guarantee to increase both the complaint and the service recovery rates by 10% (k will increase from 62.5% to 68.75% and r will increase from 80% to 88%). With $b=36$, $k_{new}=68.75$, and $r_{new}=.88$, the model predicts that customer satisfaction will increase from $P_s=.9$ to $P_{s-new} = .921$ and that, as a result, market share will increase from $P_M = .2$ to $P_{M-new} = .245$.

The additional profit per period is the additional contribution to profit due to the increase in market share less the payout given to complaining customers:

$$mM(P_{M-new} - P_M) - n(1-s)k_{new}P_{M-new}M \quad (12)$$

where m is the contribution margin per customer per period and n is the average payout per customer complaint. (This assumes that the firm is not paying out anything to customers before

the new service guarantee.) Management can compare the additional profit associated with the increased market share with the cost of the service guarantee program and make an appropriate decision regarding the service guarantee program. For $M=1000$, $m=\$1000$, and $n=\$500$, the service guarantee costs the firm \$16,818 per period, but increases the firm's profit by \$27,804 (from \$200,000 per period to \$227,804) per period, a net increase of 13.9% per period.

5. Limitations and Extensions

Limitations

Following Fornell and Wernerfelt (1988), the model assumes that customers have one transaction per period on average. If this is not true, frequency of purchase variables could be added to model this more precisely. The model assumes that satisfaction is a discrete variable with only two states (satisfied and dissatisfied) and that service recovery has only two states (recovered and not recovered). The base model also assumes that customers who experience no service failure are just as satisfied as customers who experience a service failure, complain, and are recovered. Similarly, the base model assumes that customers who experience a service failure, complain and are not recovered are just as dissatisfied as customers who experience a service failure and do not complain. The model treats customer expectations, service system design, and prices as exogenous variables and assumes that they do not change over time; the only endogenous variables that affect system performance are the service success rate, complaint rate, and recovery rate. The model also assumes that equilibrium will be reached quickly after changes in the three service parameters (\mathbf{s} , \mathbf{k} , \mathbf{r}), competitive response does not influence the equilibrium result, and the percent satisfied (P_s) does not change over time. It is likely that competitive moves with respect to the service system parameters (\mathbf{s} , \mathbf{k} , \mathbf{r}) will be met by similar

moves from competitors which would not allow the firm to achieve the full market share benefits suggested by the model. Lastly, it should be pointed out that the model is a theoretical model with little or no empirical support. (The authors are currently in the process of conducting such an empirical test with a number of firms.)

Extensions

Economic model -- The base model can be extended to consider the costs and benefits of a complaint management (Fornell & Wernerfelt 1987, 1988) or service guarantee program (Hart 1988, Hill 1995). This same economic model can also be used to find a near-optimal value of the compensation paid to recover customers. The costs include the compensation paid to customers and the fixed cost needed to setup the program. The benefits relate the profit associated with the change in market share. Assuming that the complaint rate is a function of compensation paid to customers, n , we could use the model:

$$k(n) = k_0 + (1-k_0)n/(n+g_1) \quad (13)$$

where k_0 is the complaint rate when no compensation is paid and g_1 is a shape parameter for the curve where $g_1 > 0$. The compensation paid to customers, n , also affects the recovery rate. The higher the compensation rate, the greater the recovery rate:

$$r(n) = r_0 + (1-r_0)n/(n+g_2) \quad (14)$$

where r_0 is the recovery rate when no compensation is paid and g_2 is a shape parameter for the curve where $g_2 > 0$. With a contribution margin of m dollars per customer per period, the total profit per period is $nP_M M$ less the compensation to customers who experience a service failure, $n(1-s)k(n)P_M M$. A simple economic analysis can be applied to evaluate if the benefits of a program exceed the setup costs. Standard non-linear optimization techniques can be applied to

optimize this profit function to find the optimal compensation, n^* , that should be offered to recover customers. Given that n^* affects *both* the complaint and recovery rates, this model is consistent with the arguments made by Fornell and Wernerfelt (1987, 1988), Hart (1988), and Hill (1995) that compensation to customers should be significant.

Relative satisfaction model -- It can be argued that the addition and defection models above should be extended to explicitly consider the firm's percent satisfaction rate *relative* to satisfaction for competing firms. To extend the base model to handle this, the percent satisfied term (P_s) in both the addition and defection rate models could be replaced by cP_s , where c is a factor that "normalizes" customer satisfaction relative to competition. One approach to do this would be to set $c = P_s/P_{s^*}$, where P_{s^*} is the satisfaction rate for the best competitor in the market. This model is identical to the base Service Satisfaction/Market Share Model except that R is defined as $(1 - cP_s)/cP_s$. This extension is not needed when $c \gg 1$ (a likely situation for many firms).

Asymmetric word-of-mouth model -- Unrecovered complaining customers tend to be "terrorists" who communicate more negative word-of-mouth than customers who are dissatisfied and do not complain (Blodgett, Wakefield, & Barnes, 1995). Similarly, recovered complaining customers tend to be "evangelists" who communicate more positive word-of-mouth than customers who experience no service failure (Bolton & Drew, 1992). (It should be noted that we have found no empirical evidence for this commonly held belief and that recovery probably becomes more difficult with each service failure experienced by a particular customer.) To model these relationships, we give more weight to complaining customers and less weight to non-complaining customers in both the defection and addition rate models. Using a linear combination with a parameter I where $(0 \leq I \leq 1)$, the defection rate model becomes:

$$d(t) = \mathbf{d} [(1-I)(1-s)(1-k) + I(1-s)k(1-r)]m(t) \quad (15)$$

The addition rate model can be extended in a similar way:

$$a(t) = \mathbf{a} [(1-I)s + I(1-s)kr][M-m(t)] \quad (16)$$

This model assumes that the word-of-mouth impact of "terrorists" is $I/(1-I)$ times that of "failure, no complaint" customers; similarly, the word-of-mouth impact of "evangelists" is $I/(1-I)$ times that of "no service failure" customers. The equilibrium market share model is:

$$P_M = 1/(1 + bR') \quad (17)$$

where $R' = [(1-I)(1-s)(1-k) + I(1-s)k(1-r)]/[I(1-I)s + I(1-s)kr]$. When $I=.5$, this model for P_M is identical to the base model (equation 6). When $I>.5$, the extended model gives more weight to complaining customers (both "terrorists" and "evangelists"). Note that with this extension, increasing the complaint rate (k) with a low recovery rate can *increase* the number of "terrorists" and, therefore, *reduce* market share. Increasing the recovery rate (r) is always beneficial. As I increases, the benefits of increasing the recovery rate also increase. This model shows that, in some situations, it may be beneficial to the firm to increase the recovery rate before increasing the complaint rate.

Learning model -- Hill (1995) argued that increasing the complaint rate, k , could provide useful information for the firm's product and process improvement efforts, therefore, increasing the service success rate, s . With this model, the service success rate, s , is a function of the complaint rate, k , and a "learning rate" parameter q which defines how quickly the firm learns from complaints. In period t , $1-s(t)$ percent of the customers experience a service failure with k percent of them voicing complaints to the firm. The firm fixes q percent of these problems so that they never occur again. The recursive relationship for the service success rate is then

$s(t+1) = s(t) + qk[1-s(t)]$. This extension would cause changes in the complaint rate parameter, k , to be amplified. This extension is not pursued further here.

The first three extensions (the economic, asymmetric word-of-mouth, and relative satisfaction models) are completely developed in this paper and could be combined with the basic model to create a much more sophisticated model.

6. Conclusions

This paper presents a new Service Satisfaction/Market Share Model that predicts changes in market share based on changes to three service system parameters, the service success rate, complaint rate, and service recovery rate. The model is developed from a simple static Service Satisfaction Framework that relates the three service system parameters to the customer satisfaction rate. To make the model dynamic, the paper posits intuitive dynamic defection and addition rate models that are a function of customer satisfaction. The Service Satisfaction/Market Share Model is then derived from the equilibrium conditions for the dynamic model.

The resulting Service Satisfaction/Market Share Model is surprisingly simple and intuitive and yet yields useful insights into the relationships between the service system parameters and market share in equilibrium. The three service system parameters interact strongly with one another so that changing two or more parameters at one time has a synergistic effect. Several extensions of the base model are offered to deal with more complex issues.

The model's only parameter, b , reflects the sensitivity of the firm's market share to the Dissatisfaction/Satisfaction ratio. Surprisingly, b can be estimated from only the firm's current market share and current Dissatisfaction/Satisfaction ratio. Given that b plays an important role

in the Service Satisfaction/Market Share Model and is easy to measure, it may be a useful variable in future research dealing with customer satisfaction and service quality issues.

While the primary contribution of this model is the intuitive insights that it gives to both researchers and practitioners, with empirical support this model might prove itself to be a useful tool for managers make customer service system design decisions. The authors are currently pursuing further empirical work.

The implication of this research for marketing managers is that it emphasizes the importance of “defensive marketing” in a marketing strategy. The model may be able help marketing managers evaluate investments in systems to encourage customers to voice their complaints to the firm and/or investments to improve a service delivery system to improve the service success rate. As Rust, Zahorik, and Keiningham (1995) argue, it is important for firms to be able to make these decisions on the basis of financial analysis.

The implication of this research for operations managers is that operations should carefully design complaint handling and service recovery processes for every service delivery process that has significant customer contact (Chase, 1978; Chase, 1981; Chase & Prentis, 1987; Chase & Aquilano, 1992; MacMillan & McGrath, 1997). Clearly when a customer does voice a complaint, it is important that operations managers fix the customer’s problem, fix the customer relationship, and fix the system (improve service processes so that the problem is not repeated). The model proposed in this research may be able to help operations managers evaluate investment in systems for complaint handling and service recovery.

If the marketing function provides incentives for customers to complain (such as a service guarantee), the operations function must be careful that the service success rate and the recovery rate are high in order to avoid “terrorist” activities from customers who experience

failure, complain, and are not recovered. Over time, the service failure rate should decrease as both the operations and marketing functions “learn” from information drawn from both customer complaints and the service recovery process.

The Service Satisfaction/Market Share Model helps us to better understand the relationships between the three service system parameters and market share, and, therefore, should offer an important contribution to the customer satisfaction literature.

References

- ALBRECHT, K., AND R. ZEMKE (1985), *Service America*, Dow Jones-Irwin, Homewood, IL.
- ANDERSON, E. W., C. FORNELL, AND D. R. LEHMANN (1994), “Customer Satisfaction, Market Share, and Profitability,” *Journal of Marketing*, 58, July, 53-66.
- BELL, C. R., AND R. E. ZEMKE (1987), “Service Breakdown - The Road to Recovery,” *Management Review*, October, 32-35.
- BLODGETT, J. G., K. L. WAKEFIELD, AND J. H. BARNES (1995), “The Effects of Customer Service on Consumer Complaining Behaviour,” *Journal of Services Marketing*, 9, 4, 31-42.
- BOLTON, R. N., AND J. H. DREW (1991), “A Longitudinal Analysis of the Impact of Service Changes on Customer Attitudes,” *Journal of Marketing*, 55, January, 1-9.
- BOLTON, R. N., AND J. H. DREW (1991), “A Multistage Model of Customers’ Assessments Service Quality and Value,” *Journal of Consumer Research*, 17, March, pp. 375-384.
- BOLTON, R. N., AND J. H. DREW (1992), “Mitigating the Effect of Service Encounters,” *Marketing Letters*, 3,1, 57-70.
- BOTTOM, W. P., K. GIBSON, S. DANIELS, AND J. K. MURNIGHAN (1996), “Rebuilding Relationships: Defection, Repentance, Forgiveness, and Reconciliation,” Working paper, Northwestern Graduate School of Management.
- BUZZELL, R. D., AND B. T. GALE (1987), *The PIMS Principles: Linking Strategy to Performance*, The Free Press, New York.
- CAPON, N., J. U. FARLEY, AND S. HOENIG (1990), “Determinants of Financial Performance: A Meta-Analysis,” *Management Science*, 36, October, 1143-1159.
- CHASE, R.B. (1981), “The Customer Contact Approach to Services: Theoretical Bases and Practical Extension,” *Operations Research*, 29, 4, 698-706.
- CHASE, R.B. (1978), “Where does the Customer Fit in a Service Operation?” *Harvard Business Review*, 56, 6, 137-142.
- CHASE, R.B., AND E. PRENTIS (1987), “Operations Management: A Field Rediscovered,” *Journal of Management*, 13, 2, 351-366.
- CHASE, R. B., AND N. J. AQUILANO (1992), “A Matrix for Linking Marketing and Production Variables in Service System Design,” *Production and Operations Management*, Sixth ed., Irwin, Homewood, IL.

- COLLIER, D. (1994), *The Service/Quality Solution: Using Service Management to Gain Competitive Advantage*, Irwin, Milwaukee, WI.
- CRONIN, J. J., AND S. A. TAYLOR (1992), "Measuring Service Quality: A Reexamination and Extension," *Journal of Marketing*, 56, July, 55-58.
- FAY, C. J. (1994), "Royalties From Loyalties," *Journal of Business Strategy*, 15, 2, 47-51.
- FISHER, M. L., J. H. HAMMOND, W. R. OBERMEYER, AND A. RAMAN (1994), "Making Supply Meet Demand in an Uncertain World," *Harvard Business Review*, 72, 3, 83-93.
- FORNELL, C. (1992), "A National Customer Satisfaction Barometer: The Swedish Experience," *Journal of Marketing*, 55, January, 1-21.
- FORNELL, C., M. D. JOHNSON, E. W. ANDERSON, J. CHA, AND B. E. BRYANT (1996), "The American Customer Satisfaction Index: Nature, Purpose, and Findings," *Journal of Marketing*, 60, October, 7-18.
- FORNELL, C., AND B. WERNERFELT (1987), "Defensive Marketing Strategy by Consumer Complaint Management: A Theoretical Analysis," *Journal of Marketing Research*, 24, November, 337-346.
- FORNELL, C., AND B. WERNERFELT (1988), "A Model for Customer Complaint Management," *Marketing Science*, 7, 3, 287-298.
- GERSON, R. F. (1993), *Measuring Customer Satisfaction*, Crisp Publications, Menlo Park, CA.
- HART, C.W. (1993), *Extraordinary Guarantees*, Amacom, New York.
- HART, C. W. (1988), "The Power of Unconditional Service Guarantees," *Harvard Business Review*, 66, 4, 54-62.
- HART, C. W., J. L. HESKETT, AND W. E. SASSER (1990), "The Profitable Art of Service Recovery," *Harvard Business Review*, 68, 4, 148-156.
- HESKETT, J. L., T. O. JONES, G. W. LOVEMAN, W. E. SASSER JR., AND L. A. SCHLESINGER (1994), "Putting the Service-Profit Chain to Work," *Harvard Business Review*, 72, 2, 164-174.
- HESKETT, J. L., W. E. SASSER, AND C. W. HART (1990), *Service Breakthroughs*, Free Press, New York.
- HILL, A. V. (1995), "Service Guarantees: The Fast-Track to Service Quality," *IMD Perspectives*, 2, 1-4.
- HIRSCHMAN, A. O. (1970), *Exit, Voice, and Loyalty*, Harvard University Press, Cambridge, MA.
- ITTNER, C. D., AND D. F. LARCKER (1996), "Measuring the Impact of Quality Initiatives on Firm Financial Performance," in *Advances in the Management of Organizational Quality*, 1, S. Ghosh and D. Fedor (eds.), JAI Press, Greenwich, CT, 1-37.
- JOHNSON, M. D., AND C. FORNELL (1991), "A Framework For Comparing Customer Satisfaction Across Individuals and Product Categories," *Journal of Economic Psychology*, 12, 2, 267-286.
- JONES, T. O., AND W. E. SASSER, JR. (1995), "Why Satisfied Customers Defect," *Harvard Business Review*, 73, 6, 88-99.
- KORDUPLESKI, R. E., R. T. RUST, AND A. J. ZAHORIK (1993), "Why Improving Quality Doesn't Improve Quality (Or Whatever Happened to Marketing?)," *California Management Review*, 35, 3, 82-95.
- LOVELOCK, C. (1994), *Product Plus*, McGraw-Hill, New York.

- MACMILLAN, I. C., AND R. G. MCGRATH (1997), "Discovering New Points of Differentiation," *Harvard Business Review*, 75, 4, 133-143.
- OH, H., AND S. C. PARKS (1997), "Customer Satisfaction and Service Quality: A Critical Review of the Literature and Research Implications for the Hospitality Industry," *Hospitality Research Journal*, 20, 3, 35-64.
- PHILLIPS, L. W., D. R. CHANG, AND R. D. BUZZELL (1983), "Product Quality, Cost Position, and Business Performance: A Test of Some Key Hypotheses," *Journal of Marketing*, 47, Spring, 26-43.
- REICHHELD, F. F. (1996), *The Loyalty Effect*, Harvard Business School Press, Boston, MA.
- REICHHELD, F. F., AND W. E. SASSER, JR. (1990), "Zero Defections: Quality Comes to Services," *Harvard Business Review*, 68, 5, September-October, 105-111.
- RICHINS, M. L. (1983), "Negative Word-of-Mouth by Dissatisfied Customers: A Pilot Study," *Journal of Marketing*, 47, Winter, 68-78.
- RUST, R. T., B. SUBRAMANIAN, AND M. WELLS (1992), *Marketing Management*, 1, 3, 41-44.
- RUST, R. T., A. J. ZAHORIK, AND T. KEININGHAM (1995), "Return on Quality (ROQ): Making Quality Financially Accountable," *Journal of Marketing*, 59, April, 58-70.
- SAMPSON, S. E. (1996), "Ramifications of Monitoring Service Quality Through Passively Solicited Customer Feedback," *Decision Sciences*, 27, 4, 601-622.
- SASSER, W. E., R. P. OLSON, AND D. D. WYCOFF (1978), *Management of Service Operations: Text, Cases, and Readings*, Allyn and Bacon, Boston, MA.
- SCHLESINGER, L. A. AND J. L. HESKETT (1991), "The Service-Driven Service Company," *Harvard Business Review*, 69, 5, 71-81.
- SCHMENNER, R. (1995), *Service Operations Management*, Prentice Hall, Englewood Cliffs, NJ.
- SINGH, J. (1990), "Voice, Exit, and Negative Word-of-Mouth Behaviours: An Investigation Across the Service Categories," *Journal of the Academy of Marketing Science*, 18, 1, 1-15.
- ZEITHAML, V. A., L. L. BERRY, AND A. PARASURAMAN (1996), "The Behavioral Consequences of Service Quality," *Journal of Marketing*, 60, April, 31-46.
- ZEITHAML, V. A., A. PARASURAMAN, AND L. L. BERRY (1988), "SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality," *Journal of Retailing*, 64, 1, 12-40.
- ZEITHAML, V. A., A. PARASURAMAN AND L. L. BERRY (1990), *Delivering Quality Service*, Free Press, New York.
- ZEITHAML, V. A., A. PARASURAMAN, AND L. L. BERRY (1993), "The Nature and Determinants of Customer Expectations of Service," *Journal of the Academy of Marketing Science*, 21, 1, 1-12.
- ZEMKE, R. AND C. R. BELL (1990), "Service Recovery - Doing It Right the Second Time," *Training*, June, 42-48.
- ZEMKE, R. AND C. R. BELL (1989), *Service Wisdom - Creating and Maintaining The Customer Service Edge*, Lakewood Books, Minneapolis.

Appendix 1. Terms used in this paper

- $a(t)$ Addition rate. This is the number of customers added at the end of period t .
- a Addition parameter. This is the proportion of the non-customer population, $M-m(t)$, which become customers when 100% of the customers are satisfied in period t . ($0 \leq a \leq 1$)
- b The ratio of the addition and defection parameters, a/d . ($0 \leq b \leq \infty$)
- c Normalization factor to adjust the percent satisfied P_s for competition. ($c \geq 0$)
- $d(t)$ Defection rate. This is the number of customer defections at the end of period t .
- d Defection parameter. This is the percent of dissatisfied customers who defect in one period. ($0 \leq d \leq 1$)
- k Complaint rate. This is the percent of dissatisfied customers who voice a complaint to the service-providing firm. ($0 \leq k \leq 1$)
- l Parameter for the linear combination used to give more weight to complaining customers. ($0 \leq l \leq 1$)
- M Market size in terms of the number of customers and potential customers in the market.
- $m(t)$ Number of customers for the firm in the end of period t . ($0 \leq m(t) \leq M$)
- m Contribution margin per customer per period. ($m \geq 0$)
- n Compensation paid to recover a complaining customer. ($n \geq 0$)
- P_M Market share. ($0 \leq P_M \leq 1$)
- P_s Percent of customers who are satisfied. ($0 \leq P_s \leq 1$)
- R The Dissatisfaction/Satisfaction ratio, $(1-P_s)/P_s$. ($0 \leq R \leq \infty$)
- r Service recovery rate. This is the percent of complaining customers who are recovered. ($0 \leq r \leq 1$)
- s Service success rate. This is the percent of customers who do not experience a service failure. ($0 \leq s \leq 1$)
- q Learning rate. This is the percent of the voiced problems that the firm fixes permanently in a period. ($0 \leq q \leq 1$)