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MSI was established in 1961 as a not-for-profit institute with the goal of bringing together business leaders and academics to create knowledge that will improve business performance. The primary mission was to provide intellectual leadership in marketing and its allied fields. Over the years, MSI's global network of scholars from leading graduate schools of management and thought leaders from sponsoring corporations has expanded to encompass multiple business functions and disciplines. Issues of key importance to business performance are identified by the Board of Trustees, which represents MSI corporations and the academic community. MSI supports studies by academics on these issues and disseminates the results through conferences and workshops, as well as through its publications series.

What Is the True Value of a Lost Customer?

John E. Hogan, Katherine N. Lemon, and Barak Libai

Customer profitability models have evolved into an important strategic tool for marketers in recent years. However, conventional models may be inappropriate for markets involving new products or services because they fail to account for social effects that can influence future customer acquisitions and the rate of category growth.

In this study, authors Hogan, Lemon, and Libai incorporate such social effects, and show how the value of a lost customer depends on (1) whether the customer *defects* to a competing firm or *disadopts* the technology altogether and (2) *when* the customer disadopts the technology—distinctions often overlooked in customer profitability models.

Using simulations and empirical data from the online banking industry, the authors show that when a customer disadopts, the firm not only loses the *direct* effect of customer purchases, it also loses the *indirect* effect of word-of-mouth, imitation, and other social effects that influence future customer acquisitions of the category.

Further, they demonstrate that firms suffer financial losses not only when their own customers disadopt a new service or product, but also when their competitors' customers disadopt. Specifically, a lost customer can affect the firm through "self-losses" related to disadoptions by the firm's own customers and through "competitor-based losses" related to a slowdown in the overall category-level sales. By incorporating this effect of competitors' disadopters into the customer profitability model, the authors identify a heretofore unrecognized link between a firm's market share and customer profitability.

Finally, their results demonstrate how the value of a lost customer changes throughout the product lifecycle: the loss of an early adopter costs the firm much more than the loss of a later adopter. Early in the product's life there is only a small pool of users available to affect future adopters through word-of-mouth and other social effects, and thus a single disadoption can have a significant effect on the rate of future customer acquisitions. This effect diminishes later when many more adopters join the pool of users that can influence future adopters.

Managerial Implications

One insight derived from this research is that firms relying on conventional profitability models as a basis for allocating marketing resources may be under-spending on customer retention. By doing so, these marketers may actually drive up their acquisition costs because the pool of potential adopters in a given year shrinks due to reduced social effects. As this pool shrinks, the number of customers acquired for each acquisition dollar spent declines as well.

Further, although conventional wisdom suggests that managers initially focus on customer acquisition activities and only later focus on retention spending, the value of retention is highest in the early stages of the product lifecycle.

Finally, this research raises important issues for start-ups and other small firms attempting to compete on the basis of new technologies. By virtue of their low market share, these firms are vulnerable to the way their competitors manage customer-related technology. That is, overall growth of the market can slow substantially if a major competitor has an inferior technology or service that causes many consumers to disadopt. Although a small company's competitive advantage may stem from its superior technology, it could potentially benefit by helping competitors prevent disadoptions through shared technological enhancements of the service function.

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Introduction

Consider the following scenario. Joan has heard a lot about Web-enabled cell phones recently from friends and through magazine and television ads. After several weeks of deliberation, she decides to add the service to her existing mobile phone service to access the Web and check e-mail while away from home. After a few months, she starts to use it less and less until she eventually puts it aside and cancels her service subscription.

What is the financial impact on the seller of Joan's decision to disadopt Web-enabled cell phone service? Conventional customer profitability models would attribute the lost profit to the value of Joan's *potential* product upgrades, usage, service contracts, software, and accessories that she might have purchased in the future. Yet such an approach would significantly underestimate Joan's value to the firm. Had Joan continued to use the service, she would have influenced potential customers to switch from basic cell phone service to Web-enabled service each time she used it in public or wondered aloud how she ever managed to live without it. In other words, focusing only on the "direct effect" associated with the profits from Joan's future purchases overlooks the "indirect effect" that Joan's word-of-mouth, imitation, and other social effects have on future sales. As we show in this research, the profit impact of these "lost" social effects can be substantial.

In recent years, customer profitability models have evolved into an important strategic tool for managers in a variety of markets. Although considerable research has focused on *direct* purchases when assessing the value of a lost customer (cf. Berger and Nasr 1998; Blattberg and Deighton 1996; Dwyer 1997; Rust, Lemon, and Zeithaml 2001), scholars have yet to develop a viable approach to assess *indirect* social effects. As we demonstrate in this article, focusing solely on direct purchases will understate the value of lost customers in markets where disadoptions are common. Since anecdotal evidence suggests that increasing numbers of marketers rely on individual customer profitability models to guide marketing strategy (Brady 2000), failure to include these social effects could lead to misallocation of scarce marketing resources during the critical early stages of a new product-market. Given the increasing technological content of many product and customer service applications, this appears to be a pressing management issue that should be addressed by academic research.

The purpose of this study is to develop a method for estimating the effect of disadoptions on the value of a lost customer. We demonstrate how the value of a lost customer depends on whether the customer *defects* to a competing firm or *disadopts* the product category altogether. The impact of disadoption on customer value is explored using Monte-Carlo simulations and an analysis of data from the online banking industry. Specifically, we find that a lost customer can affect the firm through "self-losses" related to disadoptions by the firm's customers and through "competitor-based losses" related to a slowdown in the overall category-level sales due to disadoptions of competing products. We also find that the value

of a lost customer changes throughout the product lifecycle, with the loss of early adopters of a technology costing the firm much more than the loss of a later adopter. Finally, we show a link between firm market share and individual customer profitability.

This research contributes to our understanding of the value of a customer in several ways. First, it reveals the importance of distinguishing between customers who disadopt entirely (stop purchasing from the category) from those who merely defect to a competing provider. Second, the research incorporates the cost of disadoption of competitor customers into customer profitability. Third, it provides a new link between customer retention and acquisition. Fourth, it provides a new tool to improve marketers' ability to assess customer profitability over time. Overall, the research suggests new reasons for firms to attend to post-purchase customer service strategies early in the evolution of the product-market to minimize the likelihood of disadoption.

The paper is organized as follows. We begin by providing a conceptual background regarding disadoption and its effects on customer profitability. We then propose an approach for valuing the effect of disadoptions on the value of a lost customer. This is followed by a Monte-Carlo simulation to determine the relative importance of key variables and an empirical illustration of the approach to the online banking industry. Finally, implications for marketing theory and practice, and directions for future research are discussed.

Conceptual Background

Defection versus Disadoption

In the years since Reichheld and Sasser (1990) first demonstrated the effect of customer retention on firm profits, researchers have made substantial progress in understanding the mechanics of customer defection. Recent studies have provided insights into defection processes (Keaveney 1995), consumer profiles of switchers (Ganesh, Arnold, and Reynolds 2000; Rust and Zahorik 1993), the role of satisfaction (Oliver 1997), and ways to prevent defections (Jones, Mothersbaugh, and Beatty 2000). Although some of the claims about the link between customer retention and profitability have been challenged recently (Dowling and Uncles 1997; Reinartz and Kumar 2000), there is a general consensus that preventing customer defections is a sound business strategy (Anderson and Mittal 2000; Zeithaml 2000).

It is important to distinguish between the effects of defection and disadoption on firm profitability. Customer defection refers to a situation in which a customer leaves one firm in order to purchase from another. When a customer defects, the firm loses the direct sales that the customer would have made had it remained loyal to the firm. In contrast, disadoption occurs when a customer rejects an innovation and ceases purchasing from the product category altogether. One of the differentiating characteristics of disadoption and defection is that there are *two* ways that disadoption can affect long-term profitability. When a customer disadopts, the firm not only loses the *direct* effect of customer purchases, it also loses the *indirect* effect of word-of-mouth, imitation, and other social effects that influence future customer acquisitions of the category. Indirect social effects are integral to the diffusion process in many markets because they help potential consumers reduce the perceived risk of adoption. As prior research has demonstrated, the contribution of these indirect social effects to the rate of category growth can be substantial (Rogers 1995).

The issue of post-adoption behavior, and specifically disadoption, has received considerable attention in the technology management literature regarding the implementation of information technology within organizations (Meyers, Sivakumar, and Nakata 1999). Several studies have found that the usage of new technologies such as material requirement planning systems (Cooper and Zmud 1990), computer-aided design systems (Liker, Fleischer, and Arnsdorf 1992) and object-oriented software (Fichman and Kemerer 1993, 1997) are often much lower than the number of reported adoptions. In a broader context, Rogers (1995) has observed the need for additional research on the antecedents and consequences of disadoption in order to more fully understand the social processes driving diffusion.

Recent research has begun to investigate the process of disadoption. Redmond (1996) examines the consumer process of quitting smoking and its antecedents utilizing a diffusion approach. Unson (2000) examines the psychological determinants of the decision to disadopt certain contraceptive methods. Finally, Kleine,

Kleine, and Allen (1995) find that consumers experience attachment to objects and, therefore, find it difficult to let go of, or disadopt, such objects. Overall, this research suggests that the decision to disadopt is significantly different than the decision to defect.

The growing body of research on disadoption suggests that it may be a substantial problem for marketers, especially in markets using new technologies to manage the customer experience. It is notable, therefore, that the problem of understanding the impact of disadoption on customer profitability has not been addressed in scholarly research. One reason for this lack of research may be that most empirical studies dealing with lost customers have focused on mature markets such as insurance, credit cards, and catalog sales where customer data are readily available. Historically, disadoption has been less of a concern for these markets because of the relative lack of technological innovation. This may no longer be the case as firms in these mature industries reengineer their customer service functions using Internet and wireless technologies. These new technologies can reduce the firm's cost-to-serve by automating previously personalized service encounters such as transaction processing and customer service. For example, the American Bankers Association estimates that banks save approximately $.80 for every personalized transaction that is converted to an ATM machine.

The economic benefits derived from such new technologies have led to a proliferation of self-service technologies like telephone-based response systems, online response systems, and interactive kiosks that enable consumers to produce a service independently of employee involvement (Meuter, Ostrom, Roundtree, and Bitner 2000). Not surprisingly, consumers often experience considerable pressure from firms to adopt these new service technologies. The banking industry has been particularly aggressive in pursuing self-service technologies by increasing the cost of using personalized service relative to automated technologies like ATMs and electronic banking (Stoneman 1997).

Another reason for the lack of research investigating the impact of disadoption on customer profitability is that incorporating indirect social effects like word-of-mouth into customer valuation models has been considered an intractable problem to date (Rust, Zahorik, and Keiningham 1995; Zeithaml 2000). Research indicates, however, that increased retention spending can lead to incremental customer acquisition as satisfied customers share their experience with others (Danaher and Rust 1996), suggesting the need to incorporate these effects into customer profitability models. In addition, the increasingly prominent role of technology in most product-markets has increased the need for managerial tools that can account for the profit impact of disadoption on customer profitability. In the following section we demonstrate how this can be accomplished.

Determining the Effect of Disadoption on the Value of a Lost Customer

Assessing the value of a lost customer requires that we distinguish between defectors and disadopters. If the relative proportion of lost customers in a market that are disadopters is α, then the value of an average lost customer is:

$$VLC = \alpha\ VLC_{disadopter} + (1 - \alpha)\ VLC_{defectors} \quad (1)$$

In some markets (typically low technology markets) the value of α will approach 0 and the value of a lost customer can be measured with conventional customer lifetime value models for defectors (cf. Berger and Nasr 1998; Dwyer 1997; Rust, Lemon, and Zeithaml 2001). However, situations where disadoptions are common, such as for technology intensive products, $\alpha > 0$ and therefore we must estimate $VLC_{disadopter}$ in order to calculate the value of an average lost customer. This study focuses on estimating $VLC_{disadopter}$. However, the relative importance of disadoptions in shaping the total value of lost customers depends on the value of α for a specific market.[1]

Estimating Future Sales with a New Product Growth Model

To estimate the financial impact of disadoptions on lost customer value, we must capture the sales effect of slower customer acquisitions caused by the reduced level of word-of-mouth and other social effects. We use the Bass new product growth model to capture these lost social effects and to describe the typical evolution for a product-market (Bass 1969; Mahajan, Muller, and Bass 1990). The model, which follows Roger's diffusion of innovation theory (1995), assumes that two forms of communication influence adopters: mass media (e.g., advertising) and social influence (e.g., word-of-mouth). One appeal of the model is that it is flexible enough to accommodate a wide variety of market-specific situations such as different marketing mixes and consumer purchase. Moreover, the basic model has been shown to have a good fit for a large number of products (see Mahajan, Muller, and Wind [2000] for a recent review and for an in-depth examination of the underlying assumptions of the model).

According to the widely used discrete version of the basic Bass model, sales at any given point in the diffusion process, $n(t)$, are given by:

$$n(t) = \left(p + q \cdot \frac{N(t)}{m}\right) \cdot (m - N(t)) \quad (2)$$

where m is the market potential, $N(t)$ is the cumulative number of adopters up to time t and the coefficients p and q represent the effects of external influence (e.g., advertising or mass media) and internal influence (e.g., word-of-mouth or imitation) respectively. Estimation of the model parameters for specific cases is a

straightforward exercise that can use analogies from similar product categories or non-linear least squares regression when there are enough data points (see Mahajan, Muller, and Wind [2000]; Parker [1994]; Srinivasan and Mason [1986] for an in-depth treatment of parameter estimation).

Estimating the Profit Impact of a Lost Customer

There are two possible sources of direct profit from customers. The first stems from the contribution margin generated from the initial purchase, while the other is derived from periodic profits generated by ongoing services or user charges. If the product is one for which there is little or no relationship with the selling firm after the sale, then the profit derived from the customer stems from the initial sale only (e.g., a DVD player). If the product is a service for which there are only periodic usage charges (e.g., Internet access), then only the periodic profits matter. A product can also have both, as in the case when a cellular service provider profits from the initial equipment purchase and the monthly usage fees. These distinct sources of profit can all be handled by our approach.

We address the problem of estimating the profit impact of a lost customer by calculating changes in the expected profitability of the firm before and after the customer has disadopted, using sales estimates from the new product growth model. It is important to note that consumers "disadopt" at the category level. However, individual firm profitability is determined by its *share* of the product category.

Consider the case in which firm i derives profits from the initial purchase (L_i) and periodic profits (K_i) for its product. If the firm has market share (S_i) and the product's life started at t_0, then the expected profit of the firm over the j periods beginning at t_1 is:

$$\pi_i\,[t_1,\, t_1+j] = S_i \cdot \sum_{t=t_1}^{t_1+j} \frac{N_1(t) \cdot K_i + n_1(t) \cdot L_i}{(1+d)^{t-t_1}} \qquad (3)$$

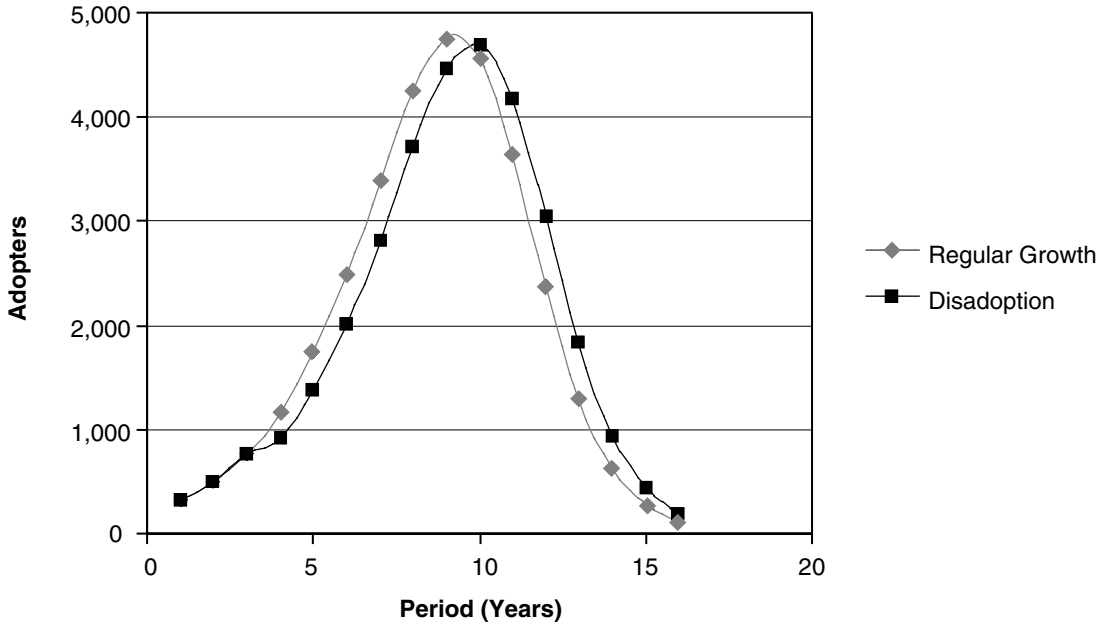
From an application perspective, it is important to note that $N_1(t)$ and $n_1(t)$ are measured at the category level as in Equation 2, and that Equation 3 can be estimated with a spreadsheet by using the data used to estimate $n_1(t)$ from Equation 1.

Now consider the consequences for firm profitability of a customer that disadopts at the beginning of period t_1. First, the seller loses the direct effect of that customer's periodic profits (K_i) from t_1 until the end of the time horizon under consideration ($t_1 + j$). A second consequence is that the growth rate of the category slows since there is one less person to influence future customers through word-of-mouth or imitation. Thus, the profit given the disadoption at time t_1 is:

$$\pi_{i(disadoption)}\,[t_1,\, t_1+j] = S_i \cdot \sum_{t=t_1}^{t_1+j} \frac{N_2(t) \cdot K_i + n_2(t) \cdot L_i}{(1+d)^{t-t_1}} \qquad (4)$$

Where $N_2(t)$ at time $t = t_1$ equals $(N_1(t) - 1)$ in the case of a single disadopter. The direct sales effect of disadoption is captured by reducing cumulative sales by one, which then affects periodic profits. The indirect sales effect of disadoption is captured by the fact that, in this case, the new sales in each period, $n_2(t)$, are

Figure 1. The Effect of Disadoptions on the Product Growth Curve



determined by the cumulative sales, $N_2(t)$. Thus, the value of a disadopter is given by the difference between equations 3 and 4.

Note that the profit impact of the indirect effect is due to the deceleration of the diffusion process. We illustrate this effect with an example in which a firm loses 100 customers in the third year as a result of new product rejection (see Figure 1). The figure illustrates how the loss slows the adoption of the product and postpones the peak of the sales curve by about a year. This deceleration of future sales creates two problems for the firm. First, it decelerates the rate of customer acquisitions, thereby reducing the value of the new technology to the firm (Srivastava, Shervani, and Fahey 1998). It also increases the probability that some competing technology will be introduced that will prevent the complete diffusion of the new product or service.

Adapting Model Assumptions to Market-Specific Conditions

The basic version of the approach presented above includes a few assumptions that should be noted. First, as with basic Bass model modeling, diffusion parameters p, q, and market potential, m, stay constant through the diffusion process. In addition, we assume that revenues from the product K_i and L_i stay constant with time. Finally, S_i represents the firm's share of the new adopters for the product category during the period. Although S_i could be estimated using a variety of survey or experimental techniques, a simple proxy would be to assume that the percentage of new adopters is equal to the firm's current market share in period t_1. In the basic model we assume that S_i stays constant through the customer valuation horizon.

An appealing aspect of our approach is that it can be adapted to accommodate market-specific conditions by relaxing the basic assumptions. In fact, even the basic Bass model itself can be replaced with alternative models. For example, any of the many extensions to the Bass model that include marketing mix and other variables could be used.[2] Yet, given the ability of the basic Bass model to capture diffusion process without decision variables (see Bass, Jain, and Krishnan [2000] for a discussion of this issue) and possible estimation problems using many parameters with limited data, we believe that the basic Bass model is sufficient in many cases.

Another assumption that can easily be relaxed is the use of a constant market share to estimate S_i. This is a reasonable assumption for relatively stable markets in which the relative market shares of competitors do not change substantially over a limited time period. However, in more dynamic markets it is possible to model S_i in equations 3 and 4 as a function of time to reflect the actual share of losing and gaining customers. Similarly, other model parameters such as the profit from initial purchase L_i and profit from per period purchase K_i can also be modeled as a function of time if appropriate.

The theoretical approach discussed above suggests that a lost customer may have a significant profit impact on the firm. However, it is important to examine the specific determinants of the value of a lost customer, to understand the magnitude of the impact of the indirect effects on customer profitability.

The Key Determinants of the Value of a Lost Customer

In this section we conduct an industry-level analysis to identify which of the market and firm variables have the greatest impact on the value of a lost customer. The analysis employs a Monte-Carlo simulation in which the key parameters (i.e., p, q, t_1, and d) were varied based on previous research and commonly observed market conditions. Based on previous findings in the new product diffusion modeling literature (Sultan, Farley, and Lehmann 1990; Parker 1994) p was sampled randomly from values ranging from .0001 to .06 and q was sampled randomly from values ranging from .1 to .7 (both means correspond to the Sultan, Farley, and Lehmann [1990] means). The value of d was sampled randomly from a range of 0 to .15 and t_1 was sampled from a range of 0 up to 10 years after the innovation was launched. For each trial of the simulation, the value of a lost customer was calculated based on the input parameters and a five-year horizon.

Based on the results, we conducted a regression analysis to examine the effect of each of the four variables on the value of a lost customer. We chose a log-linear formulation because of the expected exponential relationship between the independent variables and the dependent variable. The analysis employed a random sample of 120 observations, which exceeds generally accepted recommendations for generalizability (Hair, Anderson, Tatham, and Black 1995).

Results

The results of the regression analysis in Table 1 show that the coefficients for all four variables are significant and that the independent variables explain a large portion of the variance of the dependent variable (adj. R^2 = .63).

Table 1. Effect of Firm and Market Variables on the Value of a Lost Customer

parameter		*Standardized Coefficient*	*p-value*
p	external influence	-.432	<.0001
q	internal influence	.147	.0103
r	discount rate	.213	.0003
t_1	disadoption time	-.594	<.0001
Number of obs.	120		
F-value for model	51.2		
Adj. R^2	.63		

From the standardized coefficients we see that the time at which a customer disadopts has the largest impact on the value of the lost customer. The earlier a customer disadopts the more money the company loses. Early in the product's life there is only a small pool of users available to affect future adopters through word-of-mouth and other social effects, and thus a single disadoption can have a significant effect on the rate of future customer acquisitions. This effect diminishes later when many more adopters join the pool of users that can influence future adopters, and thus the indirect effect of a single adoption goes down.

We also see that the external influence parameter p has a negative impact on the value of a lost customer. This effect can be attributed to the number of previous adopters at any time period—the slower the penetration (due to a lower p), the lower the number of previous adopters for a given time period, and thus the higher value of each lost customer. In contrast, the internal influence parameter q has a positive impact on penetration, because a higher q means a stronger word-of-mouth effect and thus, the company loses more with each lost customer.

Finally, as expected, discount rate has a positive impact on the value of a lost customer. As the discount rate increases, current revenues become more important and, likewise, the value of a lost customer in the firm's profit stream.

The Effect of Disadoption on Market Potential

An important assumption made in the calculation of the value of a lost customer regards the ability of the firm to reacquire lost customers after they disadopt. In the basic model, we make the assumption that a lost customer does not re-join the pool of potential customers, at least for the customer lifetime horizon examined (e.g., five years). An alternative is to assume that the lost customer joins the pool of potential customers, and thus may re-adopt the product at any time after he or she disadopts. While the applicability of the assumption may be product-specific, it is important to understand how much additional profit can be earned if the customer is not lost for good upon disadoption.

To examine this point we conducted a Monte-Carlo simulation (using 5,000 trials), utilizing the same parameter range as in the simulation reported in Table 1. We examined a five-year horizon for the lost customer value calculations, and looked at a case in which there are only service charges, with no set-up charges (to avoid the situation in which a service provider makes money by charging set-up cost again to a previous disadopter).

We found that, on average, when the disadopter has the potential to re-adopt the product, the disadoption loss is reduced by nearly one-half (49 percent). This means that, even if firms cannot avoid some disadoptions, they might be able to mitigate much of the harm done by working to keep the disadopters within the pool of potential customers.

The results of the simulation highlight the critical role that indirect effects have in determining the value of a lost customer. It is important to understand the specific ways in which the firm "loses" due to the loss of a customer. To understand the specific impact of a lost customer we now turn to an empirical illustration of the approach.

Empirical Illustration

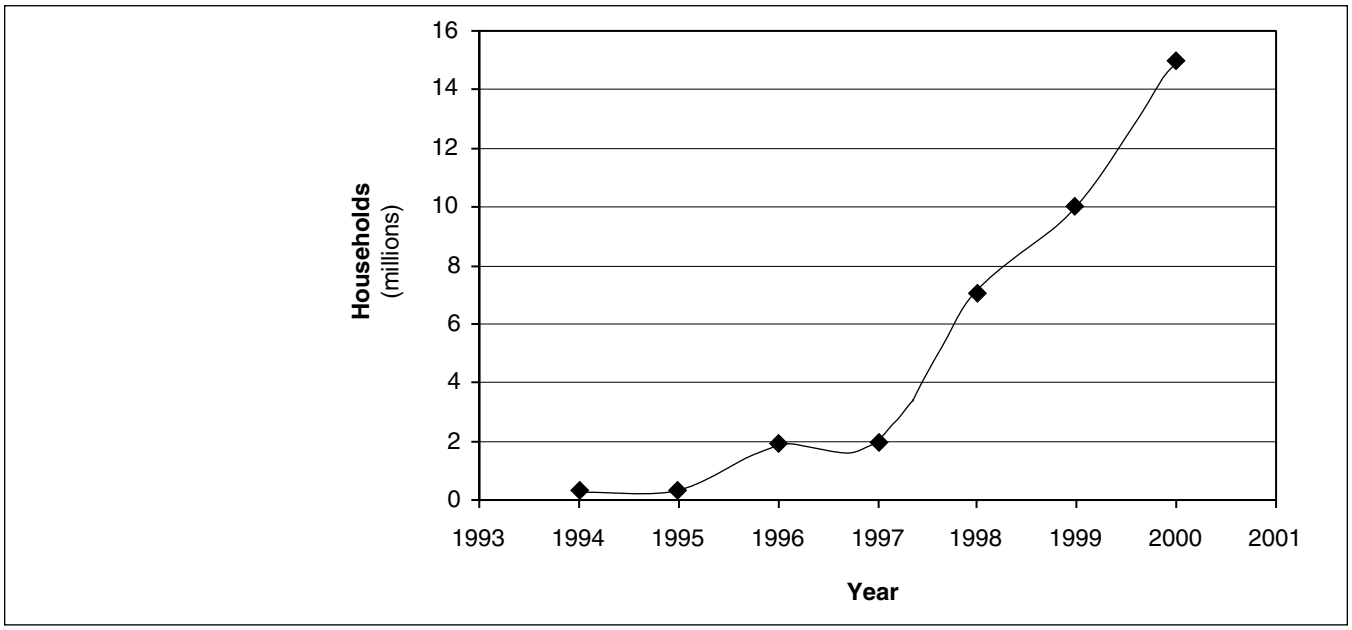
We demonstrate the model developed in the previous section by applying it to the online banking market (often called "PC banking" or "Internet banking"). With the advent of the Internet, online banking was expected to have a substantial impact on the lives of consumers. Proponents touted that it would enable consumers to conduct financial transactions at home 24 hours a day while avoiding long lines for personal tellers (Rose 2000). In addition to consumer appeal, the technology appealed to banks because it enabled them to offer more services while reducing costs. These savings could be substantial, with some industry analysts placing the variable cost of personal service as much as a hundred times the cost of online service (Orr 1999).

The surge of Internet users in the mid 1990s created pressure for banks to move rapidly into the online banking market or risk losing customers to new "e-banks" and to traditional banks with online capabilities (Robinson 2000). In response to this competitive pressure, many banks introduced online banking prematurely with inadequate technology that failed to meet consumer expectations. For many consumers, online banking turned out to be a frustrating affair that often caused as many problems as it solved (Rose 2000). Sites frequently offered limited services that required navigating a complex and often confusing customer interface. Recent consumer surveys reveal that many of the initial users have disadopted online banking and are not inclined to try it again in the near future (Robinson 2000; Rubino 2000; Trotsky 1999). Not surprisingly, the active use of online banking even among PC owners in the end of the year 2000 was much lower than initial expectations (Johnson 2000; Robinson 2000; Rubino 2000). Banking managers have realized belatedly that improving the customer's experience with online banking will require substantial capital investments (Monahan 2000). Moreover, the return on those investments can only be estimated if the bank understands the value of customers, and more importantly, the value of disadopters.

The Value of a Lost Online Banking Customer

Calculating the value of a lost customer in the online banking industry requires estimations for the diffusion parameters p, q, and m. We estimated these parameters based on data on the penetration of online banking obtained from various issues of the *Online Banking Report*, a leading industry trade publication. Household usage of online banking through the year 2000 is shown in Figure 2. This data was augmented with interviews from representatives of the American Bankers Association, the leading trade organization, and managers in the banking industry. Based on this data, we used non-linear least squares to obtain parameter estimates $p = .008$, $q = .61$, and $m = 32.4$ million households.

Figure 2. Households Using Online Banking

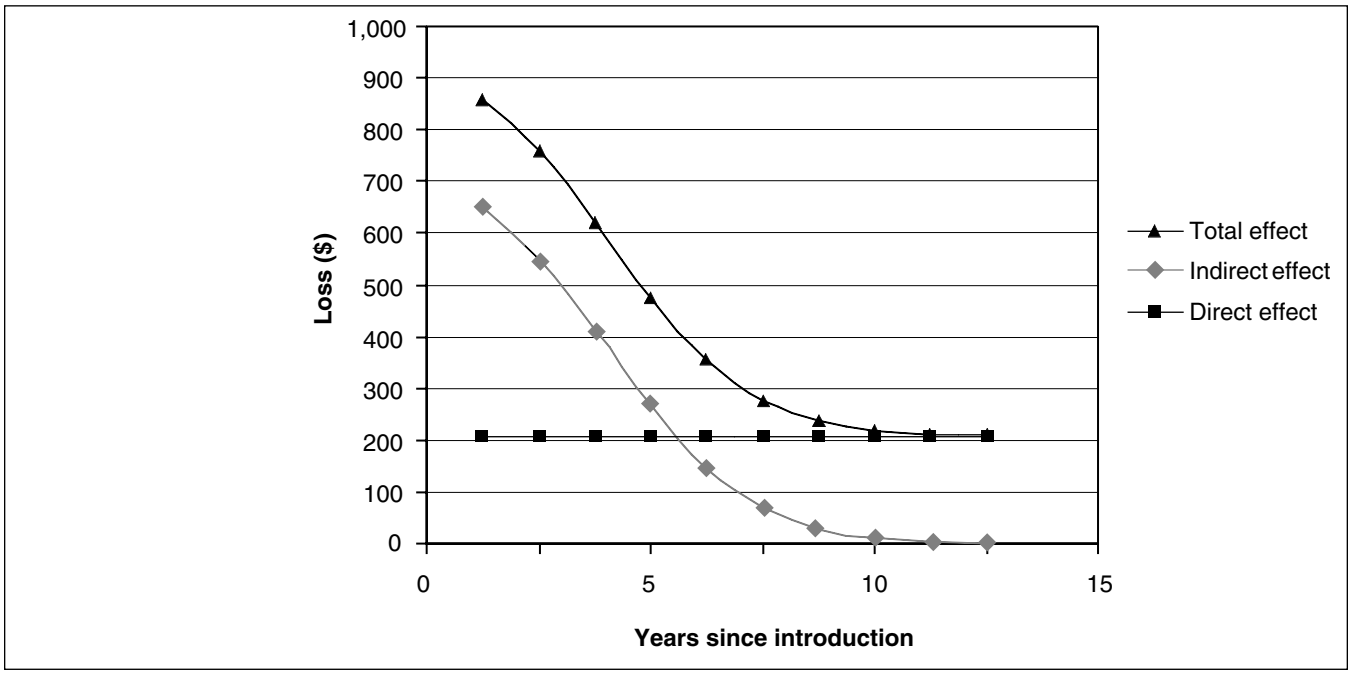


Next, we estimated the cost differential for servicing an online transaction versus a personal transaction. In general there is no initial profit from online banking at the time of subscription and thus, the variable L in equations 3 and 4 is 0. The periodic savings (K_i) of online banking versus a personal teller were estimated at $1.06 per transaction based on data provided by the American Bankers Association.[3] Thus, a customer conducting one transaction per week would save the bank approximately $55 per year.[4] For the purpose of the initial analysis, we assume a discount rate of 10 percent, a time horizon for the customer lifetime of five years as suggested by Berger and Nasr (1998), and a firm market share of 100 percent.

Based on these estimates, we show the value of a lost customer in the online banking industry against the time period in which the customer disadopted in Figure 3. The direct purchase effect is the discounted value of the $55 annual savings over five years, which is approximately $208. The indirect social effect changes with time; it is large if the disadoption occurs early in the product lifecycle and goes down exponentially in the latter stages of the lifecycle. In the case of online banking, the indirect social effect is larger than the direct purchase effect until year four. In general, the difference between the total effect (which includes the social effect) and the direct effect helps to explain the degree to which conventional customer lifetime value (CLV) models have misstated the financial impact of lost customers.

Note that the value of the loss due to a *direct effect* in Figure 3 can be seen as equivalent to the loss due to a *defection* (a customer switches to the competitor, and so there are no word-of-mouth effects at the category level). Yet, in some cases a defection can have some other negative indirect effects (e.g., positive brand-level word-of-mouth going to the competitor) and thus, for simplicity, we continue to use the term *direct effect*.

Figure 3. Value of One Lost Customer in the Online Banking Industry



Also note that in Figure 3 we measure the value of a lost customer at the time of disadoption. The valuation of a lost customer could also be assessed from a single time such as $t = 0$. In that case, the value of the lost customers at later times would be reduced due to discounting effects.

The previous analysis examined the value of a lost customer when the firm held 100 percent market share. We now extend the analysis to understand how the value of a lost customer will change when the firm has a market share of less than 100 percent.

The Effect of Competitors' Lost Customers

In conventional models, market share has no effect on customer profitability. However, when the profitability model is extended to include social effects, the relationship between market share and customer profitability becomes apparent. As previously noted, the indirect effect of a disadoption is determined by the loss of social interactions of the customer that decelerate the growth rate of the product category. When a firm has less than 100 percent market share this deceleration can occur via the disadoption of the firm's customers as well as the disadoption of its competitor's customers.

Figure 4 shows the relationship between market share and the value of a lost customer for the online banking industry after the disadoption of 10 customers from the product category two years after the introduction of the new technology (Figure 4a) and five years after introduction (Figure 4b). We again assume that the savings per year for this bank is $55. The figures demonstrate how there are actually *three* ways that disadoptions can affect the firm when market share is less than 100

Figure 4. The Effect of Market Share on Loss Due to Disadoptions for Online Banks

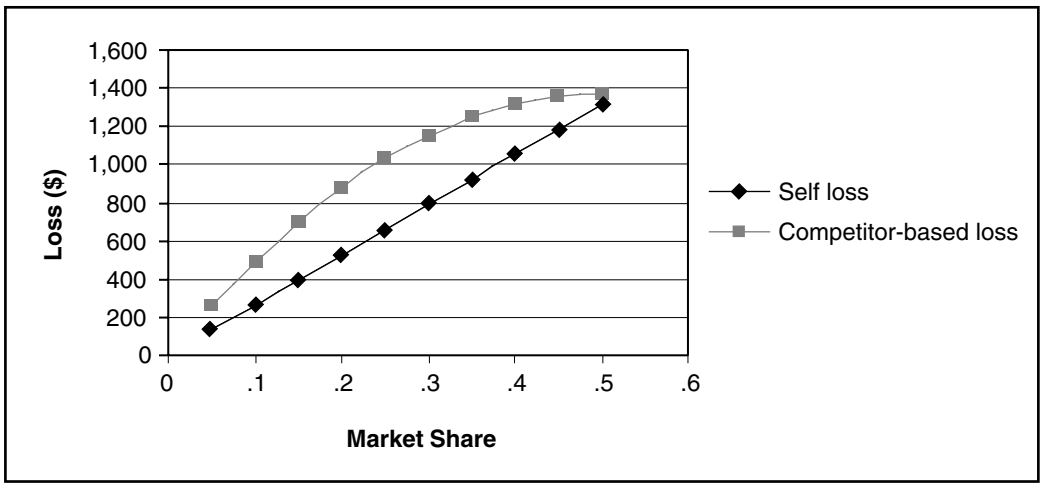


Figure 4a: Disadoption at *t* = 2 years

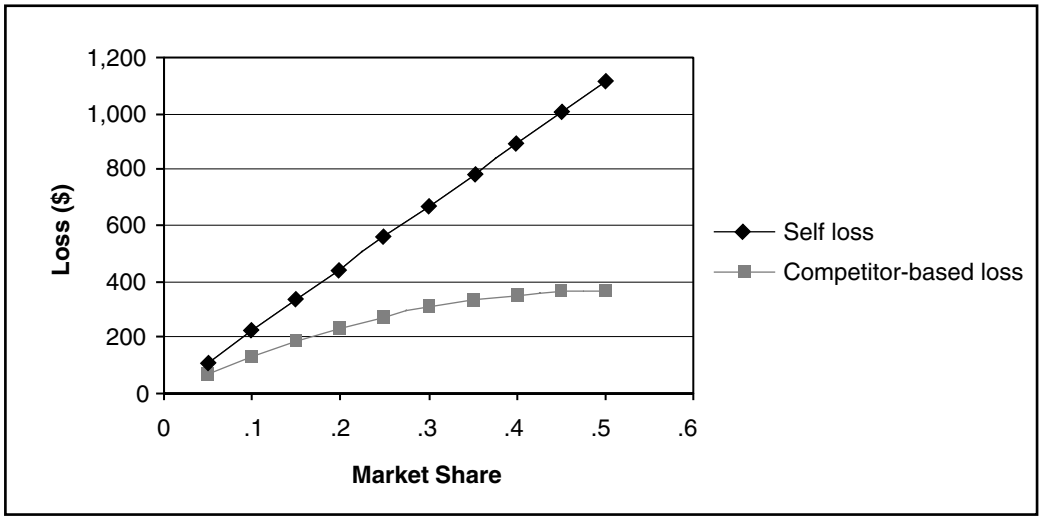
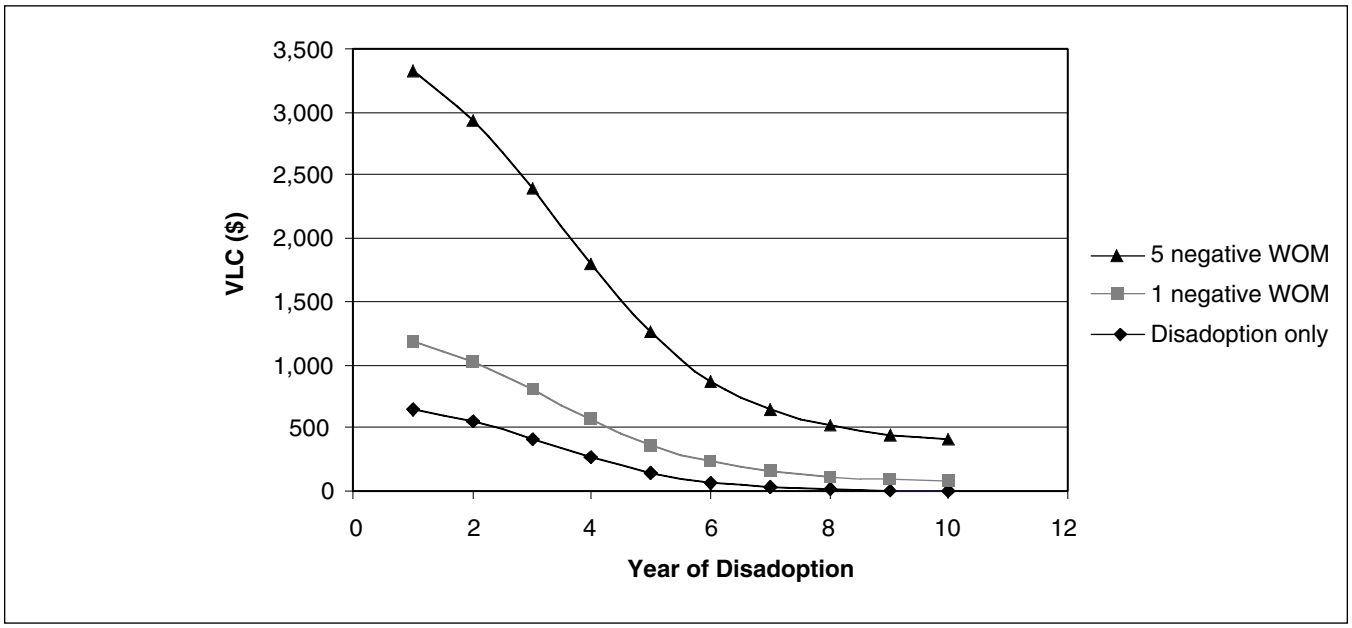


Figure 4b: Disadoption at *t* = 5 years

percent. The first two fall under the category of *self-loss* that occurs when the firm loses its own customers. Self-loss includes the direct purchase effect of its own customers who disadopted and the indirect effect—the firm's share of the social effect of these customers. For example, if firm A's market share is 10 percent, then firm A would lose one customer for every 10 disadopters, on average. This would equate to losses of $208 due to the direct effect as well as 10 percent of the lost indirect effects from that one customer. The total self-loss amounts to about $263 as shown in Figure 4a.

The third source of financial loss stems from the effects of competitors' lost customers. When competitors' customers disadopt, the absence of their word-of-mouth and imitation effects slows category-level sales and thus, reduces the future

Figure 5. The Effect of Negative Word-of-Mouth on the Value of a Lost Customer for Online Banking



sales of all firms. In our example, 9 of the 10 lost customers were purchasing from Firm A's competitors. The lost indirect effects of these 9 lost customers on Firm A's future profits amounts to $494. While on a per-customer basis the company loses more from its own customer disadoptions ($263 for one self-loss versus $494 / 9 = $54.9 for a competitor customer loss), the company's total losses are greater from its competitors' disadoptions than from its own. This result is different when the disadoption occurs later in the product lifecycle at $t_1 = 5$ (see Figure 4b). Here the self-loss is $223 and the competitor-based loss is $132 when the firm holds 10 percent market share.

We should recall that the above analysis reflects only the effect of *disadoptions* and not that of *defections* to competitors. In case of a defection one can take the competitive view that defecting customers enrich competitors and give them more resources and incentive to attack, and so the firm will probably view it in a positive way. For disadoption, as we have just shown, the story is different. In a real-life application the managerial reaction to a lost customer will be influenced by whether it is a defection or a disadoption.

Incorporating the Effect of Negative Word-of-Mouth

In the previous section we examined the effect of disadoption on customer value accounting for lost *positive* social effects such as the customer spreading positive word-of-mouth. However, when consumers are highly dissatisfied they tend to spread negative word-of-mouth about the product (Anderson 1998; Mahajan, Muller, and Kerin 1984) that will influence potential adopters not to purchase. We now extend the analysis to account for negative word-of-mouth.

Suppose that a disadopter spreads negative word-of-mouth about a product that convinces another would-be adopter to delay his or her adoption for a period of five years. Returning to the online banking example, we illustrate the detrimental effects of negative word-of-mouth on the value of a lost customer in Figure 5. As the figure shows, the total effect of disadoption at year one is $600, as previously calculated. However, the indirect effects, for a year-one disadoption, for example, have increased to approximately $1,200 due to lost positive word-of-mouth and additional negative word-of-mouth. Moreover, if the disadopter's negative word-of-mouth were to affect five customers, then cost of a lost customer soars to over $3,000. As Figure 5 demonstrates, the relationship between the time of disadoption and the value of a lost customer is magnified significantly due to negative word-of-mouth. As above, this effect is exacerbated if the negative word-of-mouth occurs early in the life of the product.

Discussion

This research investigates the effect of disadoptions on the value of a lost customer. Although researchers have long recognized that word-of-mouth and other social effects are integral to determining customer value (Danaher and Rust 1996; Rust, Zahorik, and Keiningham 1995; Zeithaml 2000), our model is among the first to show how to quantify this value. We now discuss the theoretical and managerial contributions of this research.

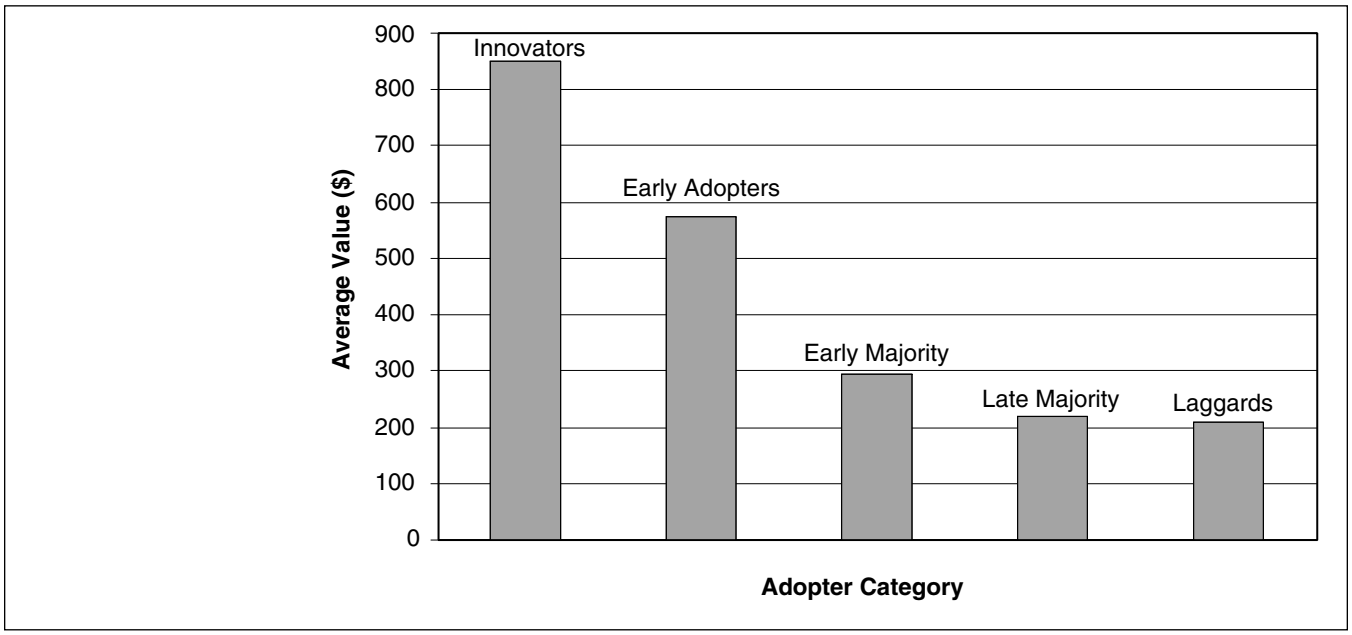
Theoretical Contributions

Disadoption versus Defection. An important implication of this research is that marketers must begin to differentiate between defection and disadoption. Considerable research has focused on understanding the antecedents to defection and the financial impact of defection on the firm (cf. Lemon, White, and Winer 2002; Reichheld and Sasser 1990; Reinartz and Kumar 2000). In contrast, comparatively little research has focused on the antecedents of disadoption (Kleine, Kleine, and Allen 1995; Redmond 1996; Rogers 1995; Unson 2000) and even less research has examined its financial impact on the firm. Although understanding and incorporating defection in customer profitability models is critical, the ubiquitous use of technology in new products and in service delivery applications suggests that failing to account for disadoption could lead to substantial errors in managerial decisions.

Linking Acquisition and Retention. Marketers increasingly recognize that customer acquisition and retention processes are interrelated and that failing to account for this relationship can lead to erroneous value assessments (Thomas 2001). The profitability model we have proposed captures one aspect of the relationship between acquisition and retention by demonstrating how the social interactions between retained customers and potential customers can affect firm profits.

Incorporating Competitive Effects into the Profitability Calculation. This research also provides new insights into how customer profitability is affected by the actions of competitors. Even when a firm has excellent product quality and has invested appropriately in its retention efforts it can suffer substantial losses from the disadoptions of competitors' customers. When a competitor's customers *defect*, it provides the firm with an opportunity to leverage its product and service quality to acquire a portion of the defectors. In contrast, when a competitor's customers *disadopt*, they leave the product category altogether and act as a decelerating force on future category sales. We have shown that the magnitude of this competitive effect is inversely related to the firm's market share. Thus, the customer profitability of smaller firms may be affected substantially by the product quality of larger firms. This is an important consideration in any market dominated by a few large firms such as banking, broadband, and telecommunications.

Figure 6. The Average Value of Adopter Categories for Online Banking



Change in CLV over the Product Lifecycle. This research also informs our understanding of how customer value changes throughout the product lifecycle. Our model provides a means to quantify the value of the various adopter categories such as innovators, early adopters, early majority, late majority, and laggards as proposed by Rogers (1995). It is commonly believed that earlier adopters are worth more to the firm because of their effect on later adopters, although we have been unable to find any empirical evidence to support this assertion. Since the value of a customer to a firm equals the profit the firm loses if the customer leaves, our approach can be utilized to examine the value of different adopter groups.

In Figure 6 we present the results of this calculation for the online banking industry. Using the online banking industry parameters in a Monte-Carlo simulation we determined average five-year customer profitability for each of the adopter categories proposed by Rogers (1995). As the figure shows, earlier adopters are indeed worth considerably more than later adopters. The distinction between the categories is even stronger if we recall that the total value includes the $208 direct value, which is the same for all categories. Thus, for online banking the social value of an innovator and an early adopter is larger than their direct value. The early-majority lost customer has a social value that is about 30 percent of the direct value, and late majority and laggards have a relatively small social value compared with their direct purchase value.

Managerial Implications

Spending on Customer Retention. One insight derived from this research is that firms relying on conventional profitability models as a basis for allocating marketing resources may be under-spending on customer retention. By under-spending

on retention, these marketers actually drive up their acquisition costs because the pool of potential adopters in a given year shrinks due to reduced social effects. As this pool shrinks, the number of customers acquired for each acquisition dollar spent declines as well.

Allocation of Retention and Acquisition Spending over Time. Conventional wisdom suggests that managers initially focus on customer acquisition activities and only later focus on retention spending. Ironically, the value of retention is highest in the early stages of the product lifecycle when managers are most likely to focus on acquisition of the initial pool of customers. This overemphasis on acquisition in the early stages of a market was typical of many Internet companies in the late nineties. Now-defunct companies like Pets.com and Homeruns.com spent lavishly on customer acquisition through the use of expensive television ads at a time when consumers were just becoming familiar with the potential uses of the Internet. However, many of the acquired customers found the online ordering and fulfillment capabilities of these firms to be inadequate and subsequently disadopted. Moreover, the rate of new adoptions quickly declined as predicted by our approach (Reichheld and Schefter 2000). A more complete understanding of customer value provided by our approach would have supported an alternative strategy that emphasized retention and post-purchase support at the earliest stages of the lifecycle.

Managing the Competitive Environment. This research raises important issues for start-ups and other small firms attempting to compete on the basis of new technologies. By virtue of their low market share, these firms are vulnerable to the way their competitors manage customer-related technology. As we have demonstrated, overall growth of the market can slow substantially if a major competitor has inferior technology or service that causes many consumers to disadopt. This creates a conundrum for small competitors with superior offerings. Although the company's competitive advantage may stem from its superior technology, it could potentially benefit by helping competitors prevent disadoptions through shared technological enhancements of the service function. Although we would not recommend that small firms give away their technology, they could benefit by helping the industry overcome disadoptions by using trade associations to monitor customer problems and solutions and conduct informational advertising to educate consumers about using new technologies.

Limitations and Future Research Directions

One limitation of the approach we have developed is that it does not account for social effects that occur in mature markets. Scholars have called for models that include word-of-mouth effects in the profitability calculation (Rust, Zahorik, and Keiningham 1995; Zeithaml 2000). Although our model partially addresses this call, additional research is needed in this important area.

We have based this research on the new product growth model first proposed by Bass (1969), which is both flexible and robust. It has been shown to provide an accurate description of new product growth across a wide variety of industries (Mahajan, Muller, and Bass 1990). Yet, other models could be usefully employed. Additional research should also investigate alternative model specifications for the Bass model. For example, a useful extension would be to include marketing mix

variables to provide a more tailored model for a particular market (see Bass, Jain, and Krishnan 2000).

Another issue relates to the ability to differentiate between the different factors that constitute a "social effect." A customer may affect others through direct word-of-mouth, imitation (even when the user is unaware of it), and network effects (where the utility of customers from the product is related to the existence of other users). The Bass model, and consequently our approach, captures all these effects together with a single parameter. Thus, distinguishing between the different social effects may require different modeling approaches such as that proposed by Hogan, Lemon, and Libai (2002) for measuring the incremental value of positive word-of-mouth.

Further analysis of negative word-of-mouth effects is another topic that should be examined in future research. We have shown that negative word-of-mouth magnifies the financial loss due to a lost customer. However, an in-depth analysis of negative word-of-mouth effects requires better theoretical grounding that can only be obtained through additional behavioral research. Among the issues to be examined is how influential is a negative word-of-mouth conversation compared to a positive one, and to what extent can negative word-of-mouth be transmitted without actual product consumptions.

Conclusions

In this paper, we have shown how the value of a lost customer depends on whether the customer *defects* to a competing firm or *disadopts* the technology altogether. Although advances in the theory and practice of customer relationship management have been substantial in the last few years, the discipline is far from mature. To date, researchers have focused almost exclusively on mature, service industries to develop and test theories and analytical models because of data availability. This restrictive focus is detrimental to the advancement of the discipline because it leads to models that may not be valid in the technology-driven markets that are rapidly becoming the norm. As we have shown in this article, researchers in this area should be concerned that practitioners are applying inappropriate models in markets where disadoptions are common. This research represents one step toward expanding the conceptual domain of customer profitability models. It is our hope that it provides a useful foundation for additional inquiry.

Notes

1. The value of α could be readily estimated using defector analysis techniques (Reichheld 1996).

2. For example, it is important to note whether a disadopter re-enters the market potential, *m*—as a potential "re-adopter," or if the disadopter is assumed to be gone forever, in which case *m* changes to reflect the loss.

3. Note that this savings could be much higher if the bank charges a monthly fee for the service. For example, SunTrust Bank in Washington, D.C. reported charging a monthly fee of $7.95 for its online bill-paying feature (*Association Management* 2001).

4. There may be other benefits to having online consumers beyond reduced service costs such as retention of higher value customers and, in the case of online banks, total customer profits the bank would lose if the customer goes offline. Given the lack of a published assessment of these other lost benefits, we utilized the more conservative estimation of service costs after consulting with banking executives. The estimation of savings per customer affects the magnitude of the financial results but not the patterns or conclusions drawn.

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