ASSESSING THE EFFECTS OF POST-PURCHASE DISSATISFACTION AND COMPLAINING BEHAVIOR ON PROFITABILITY: A MONTE CARLO SIMULATION

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ABSTRACT

The authors present a Monte Carlo simulation demonstrating the effect of post-purchase dissatisfaction and complaining behavior on profitability. Although it is widely believed that improvements in complaint management can increase profits, empirical evidence is lacking. Based on pre-specified probabilities of complaint behaviors, and inputs regarding different outcomes (specifically justice, repatronage, and word-of-mouth), a simulation model is developed. The model allows one to estimate the opportunity costs of post-purchase dissatisfaction and complaint behavior. "What if" analyses are also conducted in order to estimate the impact of changes in complaint management and recovery outcomes on profitability.

INTRODUCTION

Numerous studies report that many retailers and service providers lose a substantial number of customers each year because of post-purchase dissatisfaction (Smith and Bolton 1998; Grainer 2003, Bougie, Pieters, and Zeelenberg 2003). The source of this dissatisfaction typically stems from an inadequate or defective product or service offering, and/or shoddy customer service. It is critical to develop policies and procedures to effectively address post-purchase dissatisfaction because disgruntled customers who do not complain tend to compensate by frequenting the retailer or service provider less often and/or by purchasing fewer items or services (Chebat, Davidow, and Codjovi 2005). And, although many dissatisfied customers do voice their complaints – and thus give the retailer or service provider an opportunity to recover – a large number of these complainants end up "defecting" because the seller's recovery efforts are somehow insufficient (Maxham and Netemeyer 2002). The end result for retailers and service providers is lost sales and profits.

There is ample evidence that retailers and service providers can substantially improve their profitability by retaining a greater percentage of dissatisfied customers via more effective recovery efforts (Tax, Brown, and Chandrashekaran 1998). Indeed, several researchers have found that customer retention – in general – has a substantial impact on profitability (Anderson and Sullivan 1993; Reichheld 1996). Not only is it less costly to retain current customers as compared to attracting new patrons (Hart, Heskett, and Sasser 1990; Fornell and Wernerfelt 1988), there is also evidence that complainants who are satisfied with the recovery process oftentimes became more loyal, and hence more profitable customers (TARP 1986).

Over the years a growing body of research has investigated the impact of various strategic marketing initiatives – such as complaint management, service quality, and customer satisfaction – on key performance indicators such as market share, shareholder value, and customer lifetime value (Rust, Zahorik, and Keiningham 1995; Berger and Nasr 1998; Zeithaml 2000;

Kamakura et al. 2002). Fornell and Wernerfelt (1988), for example, demonstrated that effective complaint management can result in increased levels of market share. Similarly, Anderson, Fornell, and Lehmann (1994) found that firms that achieve higher levels of overall customer satisfaction experience greater economic returns.

Building upon this line of research, the objective of this study is to assess the impact of post-purchase dissatisfaction and complaining behavior on profitability. Although a plethora of studies have found a significant relationship between the recovery process and repatronage intentions (Blodgett, Hill, and Tax 1997; Tax, et al. 1998; Rust, Subramanian, and Wells 1992) the effect of complaint outcomes on profitability has not been explicitly quantified. In order to address this gap in our knowledge we present a Monte Carlo simulation that estimates the potential increase in profits resulting from more effective complaint management and recovery efforts. It should be noted that by doing so this study addresses a key priority of the Marketing Science Institute (2000) to link the effects of strategic marketing expenditures to financial outcomes such as profitability and net value.

THE COMPLAINING BEHAVIOR & RECOVERY PROCESS

The underlying model upon which the simulation is based is shown in Figure 1. This model depicts complaining behavior and recovery outcomes as a series of contingent events – somewhat like a decision tree – in which the probabilities of repatronage and word-of-mouth behavior vary under different circumstances (see Blodgett and Anderson 2000 for additional perspective on these points). The process begins post-purchase when a customer experiences dissatisfaction. At this point the customer must decide whether or not to complain to the seller. Variables that influence this decision include attitude toward complaining, likelihood of success, and stability/controllability attributions. Customers who do not voice their complaint to the seller are more likely instead to react by limiting future purchases from the seller; and, in order to alleviate cognitive dissonance they might also engage in negative word-of-mouth (Stephens and Gwinner 1998). Fortunately, many dissatisfied consumers do complain to the seller and request a refund, exchange, or some other form of redress. The future behavior of these complainants is then largely dependent upon the seller's recovery efforts (Tax et al. 1998). Complainants who are pleased with the recovery process/outcome (and thus perceive that justice has been done) are more likely to repatronize the seller, and might even engage in positive word-of-mouth; whereas complainants who are unhappy with the seller's recovery efforts (and thus perceive a lack of justice) are more likely to defect and to warn others not to shop at the seller.

FIGURE 1

The Consumer Complaining Behavior Process Underlying the Simulation Model
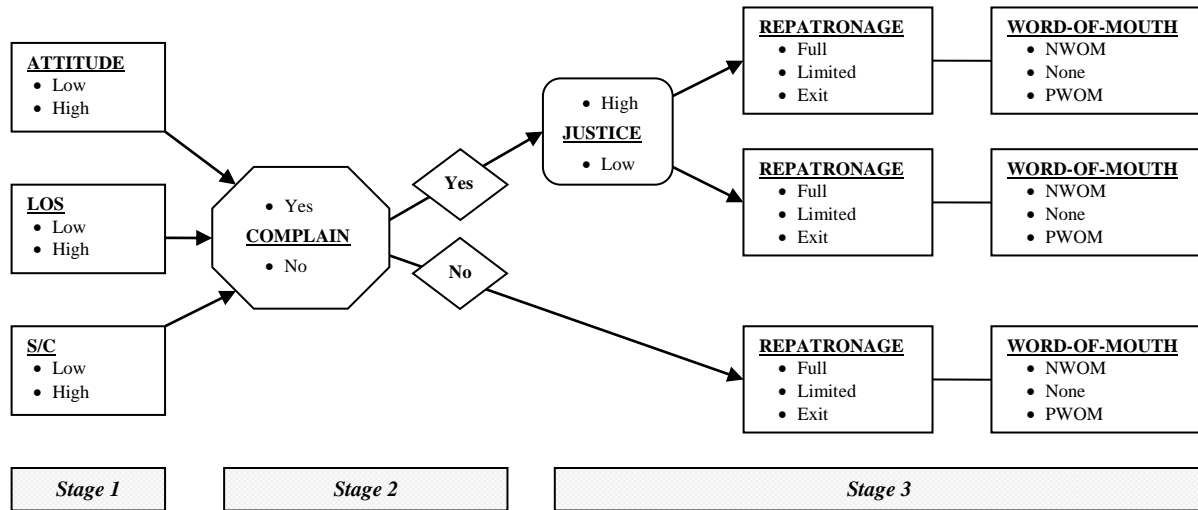
Given that the variables specified in the model have been extensively discussed in the literature this paper provides only a brief review of these constructs. Attitude toward complaining refers to an individual's predisposition to seek redress when dissatisfied with a product or service. Some consumers are more assertive and will more readily request a refund or exchange when dissatisfied, whereas others are reluctant to do so. Likelihood of success reflects the consumer's perception as to the probability of readily obtaining sufficient remedy from the seller. Dissatisfied consumers who perceive that the seller's policy is to provide a hassle-free remedy are likely to give the seller an opportunity to do so, whereas dissatisfied consumers who perceive that the recovery process would be contentious and unproductive are more likely instead to defect and bad-mouth the seller. Stability is an attribution as to whether or not the problem is common, while controllability is an attribution as to whether or not the problem could have been prevented. Consumers who attribute the problem to controllable and/or

stable causes are less likely to complain and instead are more likely to engage in negative word-of-mouth (Blodgett and Anderson 2000). Once a dissatisfied customer seeks redress the seller's recovery efforts begin, ultimately resulting in the complainant's perception of justice, which in turn affects his/her subsequent patronage and word-of-mouth behavior. Justice is multidimensional, encompassing the perceived fairness of the remedy offered by the seller (i.e., distributive justice); the nature of the interaction between the complainant and the seller (i.e., interactional justice), and the processes and procedures that determined the outcome (i.e., procedural justice). Complainants typically weigh these three dimensions in a compensatory manner. For example, a number of studies (e.g., Blodgett, Hill, and Tax 1997) have found that complainants who receive the desired outcome, but experience tense or unpleasant interactions with the seller, typically perceive an overall lack of justice. At the same time, many complainants who do not receive a full refund or exchange, but experience pleasant and respectful

interactions with the seller, report high overall levels of justice. Dissatisfied customers who do not complain and thus do not go through the recovery process, by default, do not form a perception of justice.

SIMULATION

The impact of complaint management and recovery on profitability is assessed via a Monte Carlo simulation. Simulation, in general, is a technique that imitates the operation and mechanism of a complex real-world system characterized by uncertainties and nonlinearities. In doing so it also allows for "what if" analyses based on differing conditions. Simulation has become one of the most widely used operations research techniques and has been applied in areas such as manufacturing and inventory systems, communication and transportation networks, service operations, and supply chain analysis, etc.; see Banks et al. (2004) and Law (2007). Monte Carlo simulation, in particular, is a sampling technique that generates values for random variables in a stochastic system from known (or pre-specified) probability distributions. It is one of the most popular simulation techniques among the business disciplines, and has been applied in statistics, bioinformatics, finance, industrial engineering, and operations management. For a detailed discussion on Monte Carlo simulation see Fishman (1996).

In this particular study the randomness of the simulation model is generated from two sources: customers and retailers. Dissatisfied customers' decisions as to whether or not to complain, complainants' perceptions of justice, repatronage, and word-of-mouth behavior are modeled as stochastic variables, based upon known probability distributions. In order to estimate the impact of complaint behavior and recovery outcomes on profitability certain retail inputs are also required. These inputs pertain to an array of variables – e.g., the average dollar value of a single transaction, average annual purchases of a customer prior to dissatisfaction, retailers' gross margins, the opportunity costs resulting from negative word-of-mouth, the extent of repatronage – and result in different payoffs across the various outcomes. Details regarding these parameters will be discussed next.

Pre-Specified Probabilities

The simulation model was initialized using known probabilities regarding complaining behavior and recovery. Prior and conditional probabilities regarding each of the independent and dependent variables were taken from a Bayesian model developed by Blodgett and Anderson (2000). Their data comes from a study of 502 consumers who experienced dissatisfaction with a product purchased at a retail store. A wide variety of retailers were represented in their sample, including department stores, specialty stores, discount stores, and mass merchants. In this study the independent and dependent variables were modeled as categorical variables, with attitude toward complaining, likelihood of success, stability/controllability, and perceived justice each reflecting a "high" or "low" state. The dependent variables, repatronage behavior and word-of-mouth, consisted of three categories. Dissatisfied customers reported that they 1) continued to patronize the seller on a regular or "full" basis, 2) shopped at the seller less often, on a "limited" basis, or 3) "exited" (i.e., defected). Some dissatisfied customers engaged in 1) negative word-of-mouth, while others reported 2) positive word-of-mouth behavior, or 3) no word-of-mouth.

The authors reported that 54% of the respondents complained to the seller (i.e., requested a refund, credit, exchange, or repair, etc.), whereas 46% did not seek redress. Of those who complained to the

seller, 76% reported a high level of justice whereas 24% perceived a low level of justice. Fifty-five percent of the 502 respondents had a favorable attitude toward complaining, 55% perceived a high likelihood of success, and 57% believed the problem to be neither stable nor controllable. An examination of conditional probabilities reveals the influence of these independent variables. For example, 72% of the complainants had a favorable attitude toward complaining, as compared to only 35% of the non-complainers; likewise, 74% of the complainants had initially perceived a high likelihood of successful redress versus only 31% of the non-complainers. Similarly, a greater percentage of complainants (63%) felt that the underlying cause of the problem was neither stable nor controllable, as compared to non-complainants (50%). See Table 1, below.

TABLE 1			
Prior and Conditional Probabilities			
	Prior Probabilities	**Conditional Probabilities**	
	All 502 Respondents	**Non-Complainers (46%)**	**Complainants (54%)**
Attitude = high	.55	.35	.72
Attitude = low	.45	.65	.28
Likelihood = high	.55	.31	.74
Likelihood = low	.45	.69	.26
Stable/Control = high	.43	.50	.37
Stable/Control = low	.57	.50	.63
Justice = high	n/a	n/a	.76
Justice = low	n/a	n/a	.24

Table 2 lists the conditional probabilities of repatronage and word-of-mouth. These probabilities vary considerably across non-complainers, complainants who experienced a high level of justice, and complainants who reported a lack of justice. For example, 67% of "high-justice" complainants continued to patronize the seller on a full basis, as compared to only 28% of "low-justice" complainants and 25% of non-complainants. Only 1% of high-justice complainants defected, versus 4% of non-complainants and 14% of low-justice complainants. Similarly, only 22% of high-justice complainants engaged in negative word-of-mouth, as compared to 67% of low-justice complainants and 72% of non-complainants. Forty-six percent of high-justice complainants engaged in positive word-of-mouth, and thus created goodwill (again, see Blodgett and Anderson 2000).

	Non-Complainers	Complainants	
		Justice = High	Justice = Low
Full Repatronage	.25	.67	.28
Limited Repatronage	.71	.32	.58
Exit/Defect	.04	.01	.14
Negative WOM	.72	.22	.67
No WOM	.28	.32	.33
Positive WOM	.00	.46	.00

TABLE 2

Conditional Probabilities of Repatronage and Word-of-Mouth

N = 502. Non-complainants = 46%, Complainants = 54%. Of the complainants, 76% reported a high level of justice; 24% reported a low level of justice.

Retail Inputs

As previously discussed, in order to estimate the impact of improvements in complaint management/recovery on profitability a number of retail inputs are required. These inputs, when applied to the various repatronage and word-of-mouth outcomes result in different "payoffs" – in terms of profitability – across non-complainers, complainants who experience high-justice, and complainants who encounter low-justice.

For the sake of parsimony, the inputs were based on the assumption that in each instance the source of the dissatisfaction was a mediocre or defective item purchased from a traditional retailer. Extrapolating from descriptive statistics reported by Blodgett, Granbois, and Walters (1993) it was assumed that prior to the dissatisfaction each customer had been shopping at that store on an ongoing basis, purchasing (on average) items totaling $800 per year. It was also assumed that the focal product (i.e., the source of the dissatisfaction) was priced at $75, and that the retailer maintains a 33% gross margin. Other

assumptions are that under conditions of high-justice complainants received either a full refund or an exchange, and that under conditions of low-justice complainants received either an exchange or nothing at all. The "out-of-pocket cost" of a refund or exchange was then calculated taking into consideration the retail margin earned on the original purchase, and it was assumed that the retailer could not charge back the cost of the item to the manufacturer. Furthermore, a $25 "recovery fee" was added in the case of high-justice to reflect the additional cost of superior customer service.

It was assumed that the payoffs resulting from the various levels of repatronage differ across complainants who encounter a high level of justice as compared to those who perceive a lack of justice, and to non-complainers. Given that prior research has shown that complainants who are highly satisfied with the seller's recovery efforts oftentimes become more loyal customers (Hocutt, Bowers, and Donavan 2006; Magnini et al. 2007) it was estimated that under conditions of high-justice "full" repatronage results in subsequent purchases of $1000 per

year; whereas under conditions of low-justice and for non-complainers full patronage remains at $800 per year. Because their overall experiences with the seller are quite different we feel that it is reasonable to assume that "limited" repatronage will also differ across the three groups (Hogan, Lemon, and Libai 2003). Accordingly, under conditions of high-justice limited repatronage was estimated at $500, whereas for non-complainers it was estimated at $400. Keeping in mind that under conditions of low-justice complainants have twice experienced dissatisfaction their limited repatronage was estimated at $300 annually. Of course, in all situations "exit" results in a complete lack of future purchases by that customer.

Based on previous research (Anderson 1998; Hogan et al. 2003) it is estimated that negative word-of-mouth has a detrimental effect on the seller, resulting in "opportunity" costs. These costs are due to "lost" sales from current or potential customers who avoid the retailer because of a dissatisfied customer's comments and/or criticism. Assuming that the valence and intensity of these word-of-mouth communications vary across the different situations (i.e., non-complainers, high-justice and low-justice complainants) the opportunity costs vary accordingly. In conditions of low-justice complainants are apt to be highly critical of the seller and to "get even" by warning numerous others about the seller (Bougie, Pieters, and Zeelenberg 2003), and thus the opportunity cost of their negative word-of-mouth is estimated at $400 per year. Complainants who experience a high level of justice most likely are less critical in their comments, and thus the opportunity cost of their negative word-of-mouth is estimated at $200 annually. Although negative word-of-mouth by non-complainers is probably less pointed than of that of low-justice complainants it probably is somewhat more critical than that of high-justice complainant, and thus the opportunity cost in this situation

is estimated at $300 per year. Finally, it is assumed that positive word-of-mouth creates goodwill and leads to new customers (Wangenheim and Bayón 2007), and is estimated to increase sales of other customers by $200 per year. Based on previous research which indicates that consumers weigh negative information more heavily than positive information (Brown et al. 2005) this estimate seems reasonable.

The repatronage and word-of-mouth behavior of dissatisfied customers have long-term consequences, manifesting themselves over several years. Accordingly, the financial impact of complaint management and recovery was assessed by calculating the net present value of the profits earned from purchases by these customers over the next three years, taking into consideration the costs of remedying complaints, and accounting for sales lost (i.e., opportunity costs) or gained (i.e., goodwill) due to word-of-mouth, using an 8% discount rate.

Absolute vs. Relative Measure of Profitability

It is important to note that the absolute levels of profitability as estimated by the simulation model – in and of themselves – are not of any particular relevance. Instead, knowing that the prior probabilities and retail inputs are arbitrary the resulting net present values should be evaluated in relative terms. In this case the estimated values can be compared to a base rate that reflects a "best case" scenario; e.g., in which all dissatisfied customers continue to patronize the seller on a regular basis. This type of relative measure best illustrates
the impact of a particular set of outcomes on profitability, and thus is more informative and relevant than an absolute measure. Accordingly, a base rate will be developed later in the paper to provide a standard unit of measurement.

MONTE CARLO SIMULATION MODEL

In order to simulate the consumer complaint and recovery model the *state variables* were specified, as follows:

ATTITUDE = {High, Low}

LOS = {High, Low}

S/C = {High, Low}

COMPLAIN = {Yes, No}

JUSTICE = {High, Low}

REPATRONAGE = {Full, Limited, Exit}

WORD-OF-MOUTH = {PWOM, None, NWOM}.

As per Blodgett and Anderson (2000) each variable consisted of two (e.g., High, Low) or three (e.g., Full, Limited, Exit) states. Having established these variables the Monte Carlo simulation proceeded in three stages. In Stage 1 the independent variables *ATTITUDE*, *LOS* and *S/C* were instantiated based on their prior probabilities (as listed in Table 1). For example, the probability of *LOS*=High was set at .55, and the probability of *LOS*=Low was set at .45. In Stage 2 the state of *COMPLAIN* (Yes or No) was determined based on the conditional probability: P (*COMPLAIN*|*ATTITUDE*, *LOS*, *S/C*). In other words, the probability that a dissatisfied consumer would complain to the

seller was conditional on the joint probability of the three independent variables. The various combinations of the three independent variables resulted in eight sets of joint probabilities, as shown in Table 3.

In practical terms, these probabilities reflect the odds that a dissatisfied customer who is characterized by a specific combination of *ATTITUDE, LOS,* and *S/C* will complain to the seller. In terms of simulation mechanics, these probabilities reflect the odds that the random number generator will select *COMPLAIN*=Yes or *COMPLAIN*=No, given a particular combination of the independent variables. In Stage 3 the states of *REPATRONAGE* (Full, Limited, or Exit) and *WORD-OF-MOUTH* (PWOM, None, NWOM) were determined, based on the conditional probabilities shown in Table 2.

As previously discussed, these probabilities vary; i.e., depending on the state of *COMPLAIN* (as determined in Stage 2) and the state of *JUSTICE* (which is instantiated when *COMPLAIN*=Yes). Consequently, the odds that a particular *REPATRONAGE* or *WORD-OF-MOUTH* outcome will occur vary considerable across non-complainers, complainants who experience a high level of justice, and complainants who perceive a lack of justice.

In summary, the model simulates the real world by forecasting whether complainants and non-complainers will engage in positive or negative word-of-mouth, and whether each individual will patronize the seller on a regular or a limited basis in the future (or exit), based upon a pre-determined set of probabilities.

TABLE 3
Conditional Probability of *COMPLAIN*   **Used in Stage 3 of the Simulation**

			P(*COMPLAIN*)	
ATTITUDE	**LOS**	**S/C**	**Yes**	**No**
Low	Low	Low	0.18	0.82
High	Low	Low	0.52	0.48
Low	High	Low	0.59	0.41
High	High	Low	0.88	0.12
Low	Low	High	0.12	0.88
High	Low	High	0.39	0.61
Low	High	High	0.46	0.54
High	High	High	0.81	0.19

These probabilities reflect the odds that a dissatisfied customer who is characterized by a particular level of ATTITUDE, LOS, and S/C will complain to the seller.

Simulation Results

The simulation model was implemented in Microsoft Excel using @Risk Simulation Analysis Excel Add-in. The results were based on 10,000 iterations. Based on the states of *COMPLAIN, JUSTICE, REPATRONAGE,* and *WORD-OF-MOUTH* the model generated a present value for each iteration. These figures were then averaged to determine the net present value of a customer who experienced dissatisfaction.

As previously discussed, the net present value generated by the model can be evaluated in relation to a base rate that reflects a best-case scenario. In this case, the best-case standard is defined as the net present value of a regular customer – who does not experience dissatisfaction with a product, and thus continues to shop at a rate of $800 per year and engages in no word-of-mouth – over three years at 8% interest. The resulting base rate is $687.

Based on the prior and conditional probabilities reported by Blodgett and Anderson (2000) and the retail inputs previously specified, the simulation resulted in a present value of $382, which is only 56% of the base rate. These figures illustrate that dissatisfaction can have a substantial impact on profitability. Given a situation in which many dissatisfied customers do not seek redress, and in which some complainants experience a lack of justice, the seller ends up losing out on 44% of the future profits that would have been realized had these customers not experienced dissatisfaction.

It is informative to examine the results even further, and compare the net present values across the different possible outcomes (see Table 4). For example, compared to a base rate of $687, the net present value of a complainant who experiences a high level of justice and hence becomes a more loyal customer and engages in positive word-of-mouth actually increases to $968 (i.e.,

because of increased purchases and goodwill due to PWOM); whereas the net present value of a complainant who subsequently perceives a lack of justice and hence limits future patronage and engages in negative word-of-mouth is estimated at -$111. Similarly, the net present value of a non-complainer who does not engage in any word-of-mouth but limits future patronage is estimated at $344 (which is approximately 50% of the base rate), while the net present value of a non-

complainer who exits and gets even via NWOM is estimated at -$258. Overall, the weighted average net present value of a complainant who experiences a high level of justice is $719, as compared to $230 for a non-complainant and $87 for a complainant who subsequently encounters a low level of justice. These figures certainly demonstrate the effects that the different recovery outcomes can have on profitability.

TABLE 4				
Net Present Values Across Conditions **(in $$'s)**				
REPAT	**WOM**	**High-Justice Complainants**	**Low-Justice Complainants**	**Non-Complainers**
Full	PWOM	968	834	859
Full	None	796	662	687
Full	NWOM	625	319	429
Limited	PWOM	625	–	–
Limited	None	453	233	344
Limited	NWOM	281	-111	86
Exit	PWOM	109	–	–
Exit	None	-63	-25	0
Exit	NWOM	-234	-369	-258
Weighted Average NPV		719	87	230
The weighted average is based on the joint probabilities of REPATRONAGE and WORD-OF-MOUTH, which vary across the three groups.				

"What If" Analyses

A benefit of the simulation model is that sensitivity analyses can be conducted. For example, one can estimate how improvements in complaint management and recovery efforts would affect profitability by modifying the underlying assumptions of the model; e.g., the probability that dissatisfied customers would complain to the seller, as well as the probability that complainants would experience a high level of justice. The

resulting values can then be compared to that of the original model.

To illustrate this type of "what if" analyses a truncated version of the simulation model was employed, in which the probabilities of complaining and justice were varied. In order to simplify the calculations the independent variables (ATTITUDE, LOS, and S/C) were dropped from the model. We then let both P (*COMPLAIN*=Yes) and P (*JUSTICE*=High) vary in the set of probabilities {0.1, 0.2, …, 0.9}. For each

scenario represented by the pairing of the two sets of probabilities, we ran the corresponding simulation model 10,000 iterations. The mean payoff values are shown in Table 5. These figures can be compared to the net present value resulting from the original model; i.e., $382. Table 5 shows, for example, that if the seller can increase the probability of *COMPLAIN*=Yes to .60 (i.e., from the original value of .54) and the probability of *JUSTICE*=High to .80 (i.e., from the original value of .76) the present value will increase by 21%, to $463. Similarly, if the probability of COMPLAIN=Yes can be increased even further, to .70, and the probability of JUSTICE=High improved to .90 the expected value increases by 51%, to $576. For a large retailer or service provider, such increases in present value could be substantial when applied across multiple dissatisfied customers. Indeed, this type of sensitivity analysis is valuable; by estimating how changes in complaint management policies and procedures might affect recovery outcomes a seller can determine if the incremental profits outweigh the costs of these improvements.

TABLE 5								
Mean Present Values Across Combinations of P(*COMPLAIN* =Yes AND *JUSTICE* =High)								
	Probability of *COMPLAIN* = Yes							
	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	31	31	29	28	29	24	23	22	21
.2	35	40	41	45	47	53	60	65	70
.3	41	51	60	68	76	86	98	08	18
.4	47	63	80	92	05	21	37	51	68
.5	50	72	94	13	35	56	79	99	21
.6	57	85	11	38	65	92	17	44	71
.7	62	95	28	60	94	27	60	89	22
.8	69	06	45	85	25	63	99	37	73
.9	74	17	58	02	44	87	32	76	18

(Row labels under **Probability of *JUSTICE* = High**)

These figures should be compared to that of the original model, $382.

DISCUSSION AND MANAGERIAL IMPLICATIONS

This study has demonstrated the impact of complaining behavior and re-covery outcomes on profitability. Although it has always been assumed that retailers and service providers can benefit by encouraging dissatisfied customers to complain, and by ensuring that complainants receive the outcomes they desire, the literature is short on hard evidence. The simulation model discussed in this paper is a step in the right direction. Based on empirically derived prior and conditional probabilities the results indicate that, on average, retailers realize significantly lower profits from customers who experience dissatisfaction. Profits vary considerably, though, depending on whether dissatisfied customers complain to the seller, and if so, whether they experience a high level of justice (again, see Table 4). Importantly, the model can also be used to estimate how changes in complaint management policies and procedures would affect the profitability of dissatisfied customers. One can simulate the effect of such changes by modifying the probabilities that a dissatisfied customer would perceive a high likelihood of successful redress and that a complainant would experience a high level of justice, etc., as well as the probabilities of full and limited repatronage and positive and negative word-of-mouth behavior. The present value resulting from these assumptions can then be compared to that of the original simulation model to determine the impact on profitability. This type of sensitivity analyses can indeed lead to more informed decision making. Furthermore, if it truly is more expensive to attract new customers as it is to retain dissatisfied customers then the potential for increased profitability via more effective complaint management and recovery practices is even greater than indicated by the model.

Limitations

The probabilities used to instantiate the simulation model and the retail inputs used to estimate the various payoffs should not be viewed as representative of retailers in general, nor of any retailer in particular. Although the probabilities were based on empirical data, and the retail inputs are reasonable, the results are merely illustrative. Nonetheless, the simulation model is still relevant and informative. Given that the various probabilities and retail inputs can easily be modified to reflect the situation faced by any particular retailer, and the results can be compared to a valid base rate, this type of simulation model can be a valuable managerial tool.

Future Research

Although the Monte Carlo simulation model is indeed stochastic it is relatively simplistic. More sophisticated models can be developed to allow for variance in the prior and conditional probabilities, and in the retail inputs. For example, the probabilities of repatronage and word-of-mouth could be modeled as being dependent, in part, upon the cost of the defective item. Similarly, inputs for full and limited repatronage could be dependent upon the level of prior purchases, which could vary across different customers. Additional independent variables can also be added to more precisely model the effects of situational variables on dissatisfied customers' decision to complain and seek redress. Inputs could also be modified to reflect increasing costs of recovery as the probabilities of complaining and high-justice increase. Indeed, many additions and modifications can be made to the complaint management and recovery simulation model so that it better imitates real-world conditions, and hence leads to more informed decision making.

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