Journal of Business Theory and Practice
ISSN 2329-2644
Vol. 2, No. 1, 2014
www.scholink.org/ojs/index.php/jbtp

Original Paper

Why Consumers Talk: An Investigation of the Extrinsic Motivators of Electronic Word of Mouth

Jie Feng[1]* and Purushottam Papatla[2]

[1] School of Economics & Business, SUNY Oneonta, USA

[2] School of Business Administration, UWM, USA

* Jie Feng, E-mail: fengj@oneonta.edu

Abstract

We investigate the relative effects of intrinsic and extrinsic motivators on online consumer word of mouth. Specifically, we examine how the influence of product satisfaction – an intrinsic motivator – compares to three extrinsic motivators, i.e., product life cycle stage, product attributes and expert opinions, in stimulating electronic word of mouth. We also examine the roles of different types of product attributes in generating electronic word of mouth.

The context of our investigation is electronic word of mouth for automobiles. Our results suggest that while intrinsic motivators do play a strong role in generating electronic word of mouth, extrinsic motivators such as the product's life cycle stage, its attributes and experts' opinions play a stronger role. Specifically, new products are likely to generate more word of mouth than older ones. Following the product's life cycle stage in importance are the product's attributes and expert opinions, in that order, in their influence. We also provide implications for additional research on the role of extrinsic motivators in generating consumer word of mouth.

Keywords

word of mouth, electronic word of mouth, satisfaction, product attributes, newness, expert opinions

1. Introduction

The traditional definition of word of mouth implicitly assumes that it involves a face-to-face, and oral, form of interaction by two individuals. Today, however, word of mouth is also electronic and can happen in many ways such as "Web-based opinion platforms, discussion forums, boycott Web sites, news groups" (Hennig-Thurau et al, 2004) or "consumer-opinion platforms" (Hennig-Thurau et al, 2004). This electronic word of mouth or eWOM (Hennig-Thurau et al, 2004) is thus "any positive or negative statement made by potential, actual, or former customers about a product or company, which is made available to a multitude of people and institutions via the Internet" (p. 39).

The availability "to a multitude of people and institutions via the Internet" can potentially make

electronic word of mouth very influential since what one individual says is heard by many others as opposed to just one or few as in the traditional setting (Pitt, Berton, Watson and Zinkhan, 2002). Additionally, given the presence of discussion forums and blogs, electronic word of mouth also has the potential for multiple, ongoing, conversations thus further increasing its influence relative to traditional forms of word of mouth where the conversation about a product between two consumers may happen only once. Finally, the "digitization of word of mouth" (Dellarocas, 2003) also means that the conversations between individuals can be observed by other individuals long after they take place. These characteristics of electronic word of mouth have increased its' use and influence in consumers' purchase decisions. For instance, a recent study by Comscore (2007) finds that 78% of those reading online reviews of cars, and 87% of those reading reviews of hotels, by other consumers say that the reviews influenced their purchase decision.

Given its rising importance, and influence on consumer behavior, firms need to view electronic word of mouth as another advertising mechanism and actively manage it. As pointed out by Godes et al (2005), a critical step in managing such social interactions between consumers is to understand their motivators. We examine how the influence of product satisfaction – an intrinsic motivator – compares to three extrinsic motivators, i.e., product attributes, expert opinions and product life cycle stage in stimulating word of mouth. We also assess the roles of different types of product attributes in generating word of mouth.

The context of our investigation is electronic Word of Mouth – also labeled eWOM in the literature (Hennigh-Thurau et al, 2002) - for automobiles. We choose automobiles for a number of reasons. First, it is a category that has been studied previously (e.g., Swan and Oliver 1989). Second, the lifespan of the product is long thus allowing us to examine the relationship between the volume of eWOM and the stage of the product's life cycle over relatively long periods of time. Third, eWOM is likely to occur since this is a category that consumers research and discuss on the Internet (Comscore, 2007).

Our results suggest that, while satisfaction with the product plays a major role in stimulating word of mouth, the stage of the product in its lifecycle plays a stronger role. Specifically, new products are likely to generate more word of mouth than older ones. Following the product's life cycle stage in importance are the product's attributes and expert opinions, in that order, in their influence on word of mouth. With regard to the role of specific product attributes, our results suggest that the attributes of a product can fall into one of three categories in terms of their effect on the volume of word of mouth: those in category one are *critical* attributes that increase word of mouth if the product does not perform well on them; category two consists of *indifference* attributes that do not affect the volume of word of mouth; finally, category three includes *delight* attributes that increase word of mouth if the product performs well on them.

We next describe the data that we use for our investigation. Next we present our empirical analysis and discuss our results. We conclude with a section summarizing our findings, providing their managerial implications and outlining directions for additional research related to extrinsic motivators for online

word of mouth.

2. Data

We collect our data from the Consumer Opinion pages of the online site of Consumer Reports magazine. We chose Consumer Reports because it is used by many consumers for information on cars (Ratchford, Lee & Talukdar, 2003) and also because Consumer Reports permits its' paid members to post reviews of cars. Additionally, a unique feature of the Consumer Reports site, in the context of our research, is that it provides its own ratings for the cars, The ratings are also available to those who are discussing the cars on the site. Collecting our data from the Consumer Reports site, therefore, permits us to investigate whether expert opinions do affect the volume of discussions.

Consumers who wish to post reviews at Consumer Reports go through the following steps. First, they pay a member fee and register to become members. Second, they choose the specific car, in terms of make and model, which they wish to review. They can then rate the car using a scale with different number of stars to represent their rating as follows: 5='love it', 4='pretty good', 3='Ok', 2='not so hot' and 1='hate it'. They can then go on to provide key points of their review such as pros and cons of the model. Finally, they can write detailed reviews such as their driving experience, comfort of the car and any overall comments and recommendations. The site therefore provides the opportunity for visitors to provide quite comprehensive reviews of cars. For the current research, however, we only consider the number of visitors who provide reviews of any sort as our measure of the volume of word of mouth on a model of car.

Consumer Reports launched the online consumer review platform in early 2004. Currently, the site allows visitors to review any make and model of car sold in the US from the year 2000 to date (2008). We collected our data between June 22 and June 29th of 2007 for 616 model varieties from 34 brands during the 2001 to 2006 model years. For each of the models, we collected the total number of reviews written until June 29th, 2007, by visitors. We denote this variable as TWOM in our analysis. In addition to the TWOM variable, we also collect data on the intrinsic and extrinsic factors that we investigate. We next describe how these factors are operationalized on the Consumer Reports site.

Customer Satisfaction (CS). Consumer Reports provides a customer satisfaction index based on a survey of "more than 415,000 individual vehicles". Owner-satisfaction ratings are operationalized as the percentage of those who answered "definitely yes" to the following question in a survey by Consumer Reports organization: "Considering all factors (price, performance, reliability, comfort, enjoyment, etc.), would you get this car if you had to do it all over again?"

Product Life Cycle Stage. We collect data on three attributes related to each model's age reported by Consumer Reports. The first variable, HIS, represents the model's history. Specifically, it is a measure of how many years the model has been available in the US market. Some models have a very long history. The Infiniti G, for example, was introduced in 1991 and, hence, would have a 16 year history by the time the 2006 Infiniti G was launched. Honda Pilot, on the other hand, was introduced in 2003

and would, therefore, only have a four year history by the time the 2006 Honda Pilot was introduced into the US market.

The second variable, NEW, captures whether a particular year of the model is a newly introduced design or a re-designed model. For instance, since the Toyota Prius was first introduced to the US market in 2001, the variable NEW would be assigned a value of 1 for the 2001 Toyota Prius in our data. The next time this variable takes on a value of 1 for this name would be in 2004 when a redesigned Toyota Prius was introduced.

We also include a model-year variable to capture the specific model year of a variety that consumers commented on. Thus, for instance, the variable 2006MODEL would have a value of 1 for the 2006 Honda Accord, 2006 Toyota Camry, 2006 Ford Mustang and so on. It would, however, be set to zero for other model years of the same varieties.

Product Attributes. We collect two types of attributes for each of the models that we include in our analysis. The first refers to the body type. Specifically, we record which of the following ten types the model is assigned to by Consumer Reports: SUV, pickup, van, sports, luxury, small, large, family, coupe and wagon.

The second set of attributes that we consider is related to the physical characteristics of the models. We encounter a practical challenge here due to the nature of the auto category. Many of the important attributes of a car, such as its color, engine size, type of transmission, type of brakes etc, can be selected in different combinations by different consumers. For instance, one consumer might choose a particular model with red exterior color, a black interior, a four-cylinder engine, automatic transmission and anti-lock braking system. A different consumer may choose the same model with a blue exterior, a white interior, a six-cylinder engine, a manual transmission and anti-lock brakes. Thus, it is not feasible to include specific values of product attributes for each of the 616 model varieties in our analysis.

We therefore take an alternative approach and incorporate physical characteristics in the form of reliability ratings of each model on each of thirteen common attributes. These ratings are developed by Consumer Reports based on responses from 1.3 million consumers to a quality survey in 2007 by Consumer Reports. The ratings are on a semantic differential scale with “Better” and “Worse” as the two anchors and three levels in between. We represent these ratings numerically with 5 for “Better” and 1 for “Worse” with 4, 3 and 2 assigned to the levels in the middle. The specific attributes that we include are: Engine Cooling, Transmission, Drive System, Fuel System, Electrical System, Climate System, Suspension, Brakes, Exhaust, Paint/trim/rust, Body Hardware, Power Equipment and Audio System.

Expert Opinions. In addition to providing a forum to consumers to discuss and provide reviews of cars, Consumer Reports also provides its own opinions and ratings, by its staff, of different models of cars. These opinions are summarized in the form of “Good Bet” or “Bad Bet”. A “Good Bet” rating for a model by the magazine indicates a positive opinion whereas a “Bad Bet” suggests a negative opinion. As mentioned previously, past findings suggest that auto consumers search for and use these opinions

(Ratchford, Lee & Talukdar 2003). We therefore use these ratings as our proxies for expert opinions in the form of two variables CRGOOD and CRBAD. CRGOOD takes a value of 1 for a specific car model if the model is assigned a "Good Bet" rating by Consumer Reports and 0 otherwise. Similarly, CRBAD is assigned a value of 1 for a model if the magazine's opinion of the model is that it is a "Bad Bet" and 0 otherwise.

Model Sales. In addition to data on the variables above, we also collected data on the number of units of each make and model year in the US market from the Automotive News magazine. Thus, for instance, our model sales data would indicate that there were a total of 316,638 unit sales of the 2006 Honda Civic and 51,043 unit sales of the 2003 Audi A4 model. We need this data because our empirical analysis is based on the Word of Mouth Density metric proposed by Dellarocas and Narayan (2006). In our context, this metric is defined as the ratio of the number of consumers who post reviews of a model to the number of consumers who bought the model. Table 1 presents a description and Table 2 provides summary statistics of all the variables in our data.

3. Empirical Analysis

As mentioned above, we follow the approach proposed by Dellarocas and Narayan (2006) for our empirical investigation. In particular, we first compute the density of word of mouth which is defined as the ratio of the total number of reviews posted - up to the time we collect our data - at the Consumer Reports site for a specific make, model and year of a car (e.g., Honda Civic 2006), by June 29th, 2007, to the total sales of that car in the US market during its model year. Thus, we define this variable as follows:

$$DWOM_i = \frac{TWOM_i}{Sales_i} \tag{1}$$

where the subscript represents a specific make, model and year of a car. Following Dellarocas and Narayan (2006), we use a Logit transformation of the density of word of mouth, $LDWOM_i$ as our dependent variable. Thus,

$$LDWOM_i = Log\left(\frac{DWOM_i}{(1 - DWOM_i)}\right) \tag{2}$$

Table 1. Description of Variables

Variable	Description
Sales	Unit sales for this car model
TWOM	Number of online consumer reviews posted for this car model
DWOM	Density for online consumer reviews posted for this car model is calculated by TWOM divided by SALES

CS	Consumer satisfaction index (Based on Consumer Reports survey) for this car model
HIS	The number of years the model name has been on the US market
NEW	1 if this car model is totally new model or re-designed model, 0 otherwise
2006MODEL	1 if this is a 2006 model, 0 otherwise
2005MODEL	1 if this is a 2005 model, 0 otherwise
2004MODEL	1 if this is a 2004 model, 0 otherwise
2003MODEL	1 if this is a 2003 model, 0 otherwise
2002MODEL	1 if this is a 2002 model, 0 otherwise
2001MODEL	Base
Pickup	1 if vehicle type is pickup, 0 otherwise
Van	1 if vehicle type is van, 0 otherwise
Sports	1 if vehicle type is sports, 0 otherwise
Luxury	1 if vehicle type is luxury, 0 otherwise
Small	1 if vehicle type is small, 0 otherwise
Large	1 if vehicle type is large, 0 otherwise
Family	1 if vehicle type is family, 0 otherwise
Coupe	1 if vehicle type is coupe, 0 otherwise
Wagon	1 if vehicle type is wagon, 0 otherwise
SUV	Base
Engine Cooling	Reliability of these product attributes is represented on a scale of 1 to 5 with 1 being worst reliability and 5 representing high reliability
Transmission	
Drive System	
Fuel System	
Electrical System	
Climate System	
Suspension	
Brakes	
Exhaust	
Paint/trim/rust	
Body Hardware	
Power Equipment	
Audio System	
CRGOOD	1 if this car model is endorsed by Consumer Reports as Good Bets, 0 otherwise
CRBAD	1 if this car model is reviewed by Consumer Reports as Bad Bets, 0 otherwise

Table 2.Summary Statistics of the Variables

Variable	Mean	Standard Deviation			
Sales	82063.31	81207.42			
TWOM	23.93	26.14			
DWOM	0.0004	0.0004			
CS	67.46	11.38			
HIS	7.13	4.19			
	Number of Observations in the Data	**Number of Observations as a percent of the total sample**			
NEW	126	20.45			
2006MODEL	119	19.32			
2005MODEL	129	20.94			
2004MODEL	116	18.83			
2003MODEL	96	15.58			
2002MODEL	83	13.47			
Pickup	26	4.22			
Van	37	6.01			
Sports	31	5.03			
Luxury	149	24.19			
Small	29	4.71			
Large	22	3.57			
Family	70	11.36			
Coupe	6	0.97			
Wagon	27	4.38			
CRGOOD	192	31.17			
CRBAD	59	9.58			
	Rating as a percent of the sample				
	1	**2**	**3**	**4**	**5**
Engine Cooling	4.71	4.38	7.14	13.64	70.13
Transmission	9.90	6.82	11.04	26.46	45.78
Drive System	11.85	7.47	14.45	23.21	43.02
Fuel System	7.47	8.77	17.86	27.60	38.31
Electrical System	14.77	11.04	19.81	28.73	25.65
Climate System	10.23	9.25	17.21	26.62	36.69
Suspension	12.18	8.77	15.58	24.68	38.80
Brakes	10.71	11.36	16.88	32.79	28.25

Exhaust	4.55	1.30	3.08	13.31	77.76
Paint/trim/rust	6.66	7.95	16.40	36.85	32.14
Body Hardware	12.34	9.74	25.16	32.31	20.45
Power Equipment	14.61	11.69	17.86	25.81	30.03
Audio System	15.42	12.34	22.24	31.98	18.02

Our model then relates the Logit of the density of word of mouth, in (2), to the intrinsic and extrinsic motivators discussed previously, i.e., satisfaction, product life-cycle stage, product attributes and expert opinions, through a linear regression. Given our objective of assessing the relative influence of these motivators, however, rather than including all of them simultaneously, we specify and calibrate a series of models that progressively include additional variables. Specifically, we calibrate the following models:

Model 1: Customer Satisfaction only

$$LDWOM_i = \beta_0 + \beta_1.CS_i + \beta_2.CS_i^2 + \varepsilon_i \quad (3)$$

This model thus relates the density of word of mouth to an intrinsic motivator, i.e., customer satisfaction. As in Dellarocas and Narayan (2006), we allow for a non-linear relationship between the two by including customer satisfaction through a linear as well as a square term in the model.

Model 2: Customer Satisfaction + Product Life Cycle Variables

$$\begin{aligned} LDWOM_i = {} & \beta_0 + \beta_1.CS_i + \beta_2.CS_i^2 + \beta_3.\text{HIS} + \beta_4.\text{NEW} + \\ & \beta_5 2006\text{MODEL} + \beta_6 2005\text{MODEL} + \beta_7 2004\text{MODEL} + \\ & \beta_8 2003\text{MODEL} + \beta_9 2002\text{MODEL} + \varepsilon_i \end{aligned} \quad (4)$$

Model 3: Customer Satisfaction + Product Life Cycle Variables + Body Type Variables

$$\begin{aligned} LDWOM_i = {} & \beta_0 + \beta_1.CS_i + \beta_2.CS_i^2 + \beta_3.\text{HIS} + \beta_4.\text{NEW} + \\ & \beta_5 2006\text{MODEL} + \beta_6 2005\text{MODEL} + \beta_7 2004\text{MODEL} + \\ & \beta_8 2003\text{MODEL} + \beta_9 2002\text{MODEL} + \beta_{10}.\text{Pickup} + \\ & \beta_{11}.\text{Van} + \beta_{12}.\text{Sports} + \beta_{13}.\text{Luxury} + \beta_{14}.\text{Small} + \beta_{15}.\text{Large} + \\ & \beta_{16}\text{Family} + \beta_{17}.\text{Coupe} + \beta_{18}.\text{Wagon} + \varepsilon_i \end{aligned} \quad (5)$$

Model 4: Customer Satisfaction + Product Life Cycle Variables + Body Type Variables + Product Characteristics

$$\begin{aligned} LDWOM_i = {} & \beta_0 + \beta_1.CS_i + \beta_2.CS_i^2 + \beta_3.\text{HIS} + \beta_4.\text{NEW} + \\ & \beta_5 2006\text{MODEL} + \beta_6 2005\text{MODEL} + \beta_7 2004\text{MODEL} + \\ & \beta_8 2003\text{MODEL} + \beta_9 2002\text{MODEL} + \beta_{10}.\text{Pickup} + \\ & \beta_{11}.\text{Van} + \beta_{12}.\text{Sports} + \beta_{13}.\text{Luxury} + \beta_{14}.\text{Small} + \beta_{15}.\text{Large} + \\ & \beta_{16}\text{Family} + \beta_{17}.\text{Coupe} + \beta_{18}.\text{Wagon} + \beta_{19}\text{Engine Cooling} + \\ & \beta_{20}.\text{Transmission} + \beta_{21}.\text{Drive System} + \beta_{22}.\text{Fuel System} + \\ & \beta_{23}.\text{Electrical System} + \beta_{24}.\text{Climate System} + \beta_{25}.\text{Suspension} + \\ & \beta_{26}.\text{Brakes} + \beta_{27}.\text{Exhaust} + \beta_{28}.\text{Paint/trim/rust} + \\ & \beta_{29}.\text{Body Hardware} + \beta_{30}.\text{Power Equipment} + \\ & \beta_{31}.\text{Audio System} + \varepsilon_i \end{aligned} \tag{6}$$

Model 5: Customer Satisfaction + Product Life Cycle Variables + Body Type Variables + Product Characteristics + Expert Opinions

$$\begin{aligned} (Model\ 5)\ LDWOM_i = {} & \beta_0 + \beta_1.CS_i + \beta_2.CS_i^2 + \beta_3.\text{HIS} + \beta_4.\text{NEW} + \\ & \beta_5 2006\text{MODEL} + \beta_6 2005\text{MODEL} + \beta_7 2004\text{MODEL} + \\ & \beta_8 2003\text{MODEL} + \beta_9 2002\text{MODEL} + \beta_{10}.\text{Pickup} + \\ & \beta_{11}.\text{Van} + \beta_{12}.\text{Sports} + \beta_{13}.\text{Luxury} + \beta_{14}.\text{Small} + \beta_{15}.\text{Large} + \\ & \beta_{16}\text{Family} + \beta_{17}.\text{Coupe} + \beta_{18}.\text{Wagon} + \beta_{19}\text{Engine Cooling} + \\ & \beta_{20}.\text{Transmission} + \beta_{21}.\text{Drive System} + \beta_{22}.\text{Fuel System} + \\ & \beta_{23}.\text{Electrical System} + \beta_{24}.\text{Climate System} + \beta_{25}.\text{Suspension} + \\ & \beta_{26}.\text{Brakes} + \beta_{27}.\text{Exhaust} + \beta_{28}.\text{Paint/trim/rust} + \\ & \beta_{29}.\text{Body Hardware} + \beta_{30}.\text{Power Equipment} + \\ & \beta_{31}.\text{Audio System} + \beta_{32}.CRGOOD + \beta_{33}.CRBAD + \varepsilon_i \end{aligned} \tag{7}$$

Thus, comparing models 2 and 1, in terms of their fit to the data, will provide an indication of the influence of product lifecycle stage on the volume of word of mouth over and above that of customer satisfaction. Similarly, comparing models 3 and 2 will help us assess if, and how much, product type – which is one product attribute of cars – affects the volume of word of mouth compared to the role of customer satisfaction and product lifecycle variables. Model 4 provides additional insights in this regard and should help us understand whether product attributes play a role and, if they do, what the role of different attributes is. Finally, model 5 will help us understand the relative influence of expert opinions on the volume of word of mouth.

4. Results

The parameter estimates and model fits of the five models are presented in Table 3. The results in this table provide two insights into the relative roles of the different types of factors that influence word of mouth. First, the fits of the models – in terms of the adjusted R-squares – suggest that, of the multiple factors that we consider in the model, customer satisfaction and product life-cycle variables are the most influential in generating customer word of mouth. Product attributes (as represented by the variables included in models 3 and 4) also explain as much of the volume of word of mouth as customer satisfaction does. Finally, expert opinions also play a role but one which is substantially smaller than the roles of customer satisfaction, product life cycle variables or product attributes.

Second, the estimated parameter values are remarkably stable both in terms of magnitude as well as significance across all five model specifications. This is reassuring because it suggests that the variables

Table 3. Model fits and Parameter Estimates (Consumer Reports data)

	Satisfaction	Satisfaction + Product Life Cycle Stage	Satisfaction + Product Life Cycle Stage + Product Type	Satisfaction + Product Life Cycle Stage + Product Type + Reliability of attributes	Satisfaction + Product Life Cycle Stage + Product Type + Reliability of Attributes + Expert Opinions
Intercept	-8.1966***	-8.4976***	-8.6053***	-8.4783***	-8.1564***
CS	0.0295***	0.0346***	0.0301***	0.0287***	0.0203***
CS^2	0.0003	0.0005***	0.0006***	0.0006***	0.0005**
HIS	--	-0.0429***	-0.0450***	-0.0419***	-0.0426***
NEW	--	0.4291***	0.4254***	0.3993***	0.3749***
2006MODEL	--	0.8230***	0.8336***	0.7135***	0.9146***
2005MODEL	--	0.8681***	0.8710***	0.8187***	0.9144***
2004MODEL	--	0.4325***	0.4313***	0.4403***	0.4711***
2003MODEL	--	0.2286*	0.2331**	0.2651**	0.2640**
2002MODEL	--	0.1983	0.2015*	0.2315**	0.2163**
PICKUP	--	--	-0.3515**	-0.2425	-0.0050
VAN	--	--	0.2318*	0.1779	0.0959
SPORTS	--	--	0.0958	-0.0516	0.1068
LUXURY	--	--	0.5044***	0.4625***	0.4979***

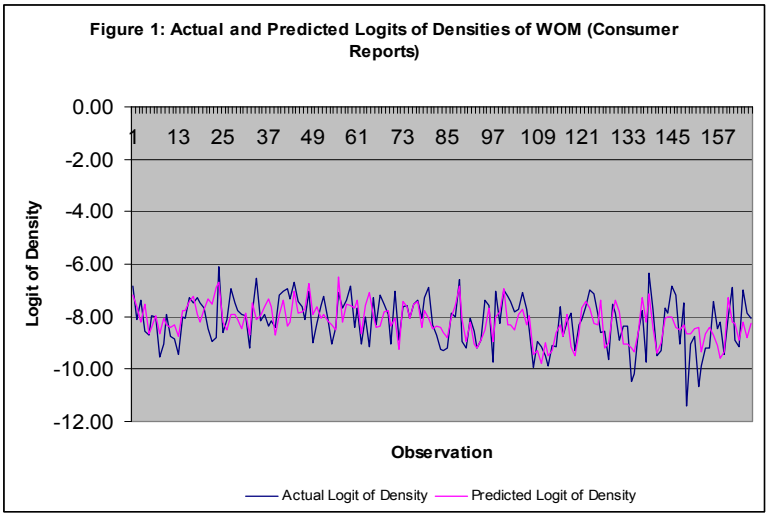
SMALL	--	--	-0.2009	-0.2605*	-0.3550**
LARGE	--	--	-0.1758	-0.1848	-0.0441
FAMILY	--	--	-0.0634	-0.1137	-0.0522
COUPE	--	--	0.0703	-0.0381	-0.0676
WAGON	--	--	0.1785	0.2137	0.2644*
ENGINE	--	--	--	-0.0462	-0.0789**
COOLING					
TRANSMISSION	--	--	--	0.0418	0.0292
DRIVE SYSTEM	--	--	--	0.0327	0.0205
FUEL SYSTEM	--	--	--	-0.0231	-0.0543*
ELECTRICAL	--	--	--	-0.0421	-0.0723**
SYSTEM					
CLIMATE	--	--	--	0.0317	0.0171
SYSTEM					
SUSPENSION	--	--	--	0.0904***	0.0560*
BRAKES	--	--	--	-0.0324	-0.0055
EXHAUST	--	--	--	-0.0319	-0.0188
PAINTTRIMRUST	--	--	--	0.0560*	0.0669**
BODY	--	--	--	-0.0964***	-0.1127***
HARDWARE					
POWER	--	--	--	0.0928***	0.0777**
EQUIPMENT					
AUDIO SYSTEM	--	--	--	-0.1056***	-0.1176***
CRGOOD	--	--	--	--	0.6284***
CRBAD	--	--	--	--	0.0528
Adjusted-R^2	0.130	0.305	0.370	0.417	0.463
N=	616	616	616	616	616

Notes: *** P<0.01; ** P<0.05; * P<0.1

That are being progressively added to the models are entering with additional explanatory power over and above the variables that are already in the model. This suggests that the roles of each of the types of variables that we are including are independent of those of the other variables.

Overall, the results suggest that the model with all variables, Model 5, is the best fitting specification. We wanted to assess the reliability of this specification by investigating its predictive performance. We therefore divided the sample into two parts randomly: a calibration part with 450 observations and a prediction part with the remaining 166. We then re-calibrated model 5 on the calibration sample and used the resulting parameter estimates to predict the logit of the density of word of mouth (the

dependent variable) in the prediction sample. Figure 1 gives a plot of the predicted and actual densities. Clearly, the model is able to track the magnitude and direction of the densities quite closely. The mean square error of the predicted logits of the densities is only 0.557 which is remarkably small since the actual values range between -6.12 and -11.38 with a mean of -8.17. We next discuss the implications of the estimates regarding how each type of variable influences the volume of word of mouth.



Customer Satisfaction. The fit of Model 1 (in terms of the adjusted R-square included at the bottom of the table) suggests that customer satisfaction does influence the volume of word of mouth. Additionally, the positive, and significant, parameters for both the linear and non-linear terms in Model 5 indicate that the influence is quite strong.

Product Life Cycle Stage. The jump in adjusted r-square from 0.13 in model 1 to 0.31 in model 2 with the addition of the product life cycle stage variables is a clear indication that they have a strong influence on the volume of word of mouth. In fact, the size of the increase suggests that these variables play a bigger role than customer satisfaction in generating discussions of the product.

Turning to the estimates, in model 5, the parameters of all of the life-cycle variables are highly significant. Additionally, they are in the direction that we would expect. Thus, the parameter for HIS is negative suggesting that models with longer histories are likely to generate fewer discussions and word of mouth than those with short ones. In contrast, the parameter for the variable NEW is positive thus indicating that word of mouth will be higher for newer models. Similarly, the parameters for all the model years are positive but decreasing in magnitude as we go from 2006 to 2002. This is consistent with the other two parameters of the product lifecycle variables – newer models are likely to attract more word of mouth than older ones. Thus, overall, these findings suggest that product life-cycle variables have a strong influence on the volume of word of mouth in this category.

Product Attributes – body type. Only three of the nine body types included in our analysis have a significant effect on the volume of word of mouth. We cannot, however, conclude from this that the

role of body type on the volume of word of mouth is not strong since adjusted R-square does increase from 0.31 in to 0.37 as we move from Model 2 to Model 3. Substantively, the estimates suggest that luxury and wagon models are likely to generate more word of mouth while smaller cars attract less.

Product Attributes – physical characteristics. Turning to the role of physical characteristics, a comparison of the fits of models 3 and 4 – with adjusted R-square increasing from 0.37 to 0.42 - suggests that they do influence the volume of word of mouth although not to the same extent as customer satisfaction or body type. In terms of the specific effects, we find that five of the eight significant effects are negative while the other three are positive. The negative estimates suggest that, if the reliability ratings on the associated characteristics are high, the volume of word of mouth comes down. This suggests that consumers expect cars to be reliable on these attributes and would talk about them – presumably, negatively – if they are not. In other words, these are *critical attributes* that manufacturers should ensure that their product delivers well on. Positive estimates, on the other hand, mean that high reliability on the associated characteristics increases word of mouth; suspension, paint/trim/rust and power equipment have such positive estimates. We label these characteristics as *delight attributes* in that consumers do not seem to expect much from them and, if manufacturers do provide good performance on these attributes, consumers will be pleased and talk about them to others. The other attributes – which have neither positive nor negative significant effects – are labeled as *indifference* attributes since consumers seem to be indifferent to them and they do not affect the volume of word of mouth.

Expert Opinions. The influence of expert opinions on the volume of word of mouth, as measured by the improvement in model fit in going from model 4 to model 5, is about as much as that in going from model 3 to model 4, i.e., as much as that of physical characteristics. The pattern of the two parameters CRGOOD and CRBAD, however, suggests that positive ratings by experts increases word of mouth while negative ratings do not necessarily lead to a reduction.

Replication of findings. Our findings provide some insights into the relative roles of (a) intrinsic and extrinsic motivators and (b) relative influence of different extrinsic motivators. We, however, wanted to investigate whether our findings are limited to the type of population at the Consumer Reports site or whether they are replicable at other sites that also provide car buyers the opportunity to discuss cars. We therefore collected data on the total number of reviews posted by consumers, for each of the same set of 616 model varieties, from another site, edmunds.com. As reported in Ratchford, Talukdar and Lee (2003), this site attracts a larger number of consumers searching for information on cars than the Consumer Reports site.

In addition to the number of reviews, we also collected data on the opinions expressed by Edmunds.com's experts on each of the 616 model varieties. One difference between Edmunds.com and Consumer Reports is that Edmunds.com gives an "Editors' Choice" rating for only varieties that it recommends to consumers. The site's experts, however, do not comment on the other varieties. We, therefore, only have a measure analogous to CRGOOD – the "Best Bet" recommendation of Consumer

Reports – but do not have one corresponding to CRBAD which is Consumer Reports' recommendation to not buy a variety. Thus, in all, we collect two variables from Edmunds.com's site: the total volume of word of mouth for each of the 616 varieties and a variable, that we label EDGOOD, similar to the CRGOOD variable from the Consumer Reports site. Data for all the other variables in the analysis – consumer satisfaction, product life cycle variables, body type and reliability ratings on attributes – is the same as for the Consumer Reports data since these variables are not specific to either site.

We calibrated the same set of five models that we specified for the Consumer Reports site on the Edmunds.com data as well. The results are presented in Table 4. The results in this table suggest that even positive expert opinions do not have a significant effect on the volume of word of mouth at this site and, consequently, the model with all the other attributes has the highest adjusted R-square. We therefore select this model, i.e., the specification with satisfaction, product life cycle stage, product type and product attributes in Column 5, as the best fitting model. As in the case of the Consumer Reports data, we assessed the predictive performance of this specification by dividing the Edmunds.com data into calibration and prediction samples, re-calibrating the model on the calibration sample and predicting the logit of the density of word of mouth for the prediction sample. Figure 2 presents a comparison of the predicted and actual densities. As in the case of the Consumer Reports data, it is clear that the model is able to track the densities quite closely both in terms of magnitude and direction. The mean square error of the predicted logits of the densities is only 0.54 which, as in the case of the Consumer Reports data, is remarkably small since the actual values range between -3.63 and -8.95 with a mean of -6.34. We next compare the estimates from this model with the corresponding ones for the Consumer Reports data. Table 5 provides a side-by-side comparison of the two sets of estimates.

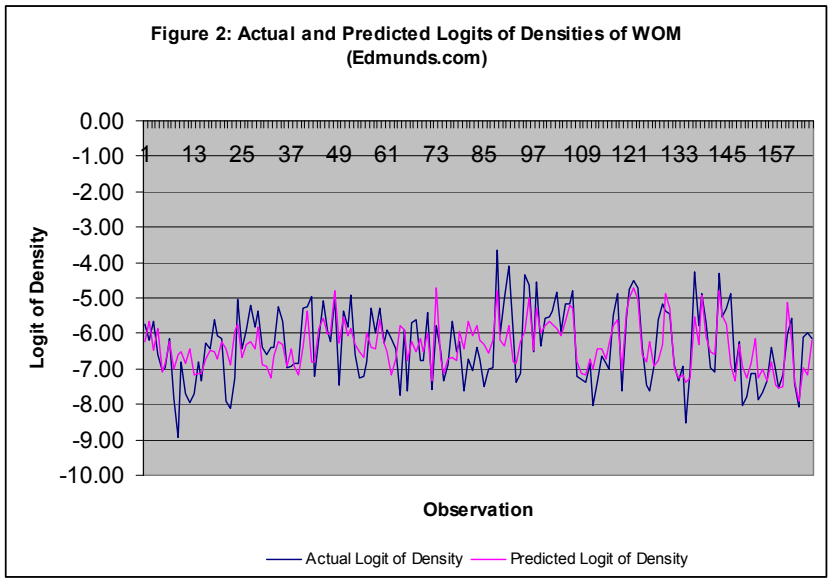


Table 4. Model fits and Parameter Estimates (Edmunds data)

	Satisfaction	Satisfaction + Product Life Cycle Stage	Satisfaction + Product Life Cycle Stage + Product Type	Satisfaction + Product Life Cycle Stage + Product Type + Reliability of attributes	Satisfaction + Product Life Cycle Stage + Product Type + Reliability of Attributes + Expert Opinions
Intercept	-6.3027***	-6.8584***	-7.0941***	-6.0777***	-6.0855***
CS	0.0148***	0.0197***	0.0096***	0.0168***	0.0166***
CS^2	0.0001	0.0003	0.0006***	0.0008***	0.0008***
HIS	--	-0.0484***	-0.0624***	-0.0601***	-0.0602***
NEW	--	0.5104***	0.4997***	0.3977***	0.3978***
2006MODEL	--	0.6644***	0.7650***	0.9439***	0.9437***
2005MODEL	--	0.8620***	0.9203***	0.9799***	0.9814***
2004MODEL	--	1.1954***	1.2334***	1.3074***	1.3080***
2003MODEL	--	0.9103***	0.9310***	1.0148***	1.0100***
2002MODEL	--	0.6184***	0.6428***	0.7184***	0.7145***
PICKUP	--	--	-0.3210**	0.0322	0.0259
VAN	--	--	-0.1599	-0.3099**	-0.3096**
SPORTS	--	--	1.2030***	0.9027***	0.9033***
LUXURY	--	--	0.9336***	0.7701***	0.7697***
SMALL	--	--	-0.2246	-0.1355	-0.1399
LARGE	--	--	-0.1877	-0.1321	-0.1315
FAMILY	--	--	0.0162	0.0358	0.0376
COUPE	--	--	0.9652***	0.5061*	0.5040*
WAGON	--	--	0.0374	0.1810	0.1775
ENGINE COOLING	--	--	--	-0.0807**	-0.0812**
TRANSMISSION	--	--	--	0.0384	0.0387
DRIVE SYSTEM	--	--	--	0.0061	0.0062
FUEL SYSTEM	--	--	--	0.0104	0.0106
ELECTRICAL SYSTEM	--	--	--	-0.0674**	-0.0668**

CLIMATE	--	--	--	0.0309	0.0314
SYSTEM					
SUSPENSION	--	--	--	0.0702**	0.0700**
BRAKES	--	--	--	-0.0061	-0.0052
EXHAUST	--	--	--	-0.0653**	-0.0657**
PAINTTRIMRUST	--	--	--	0.0386	0.0376
BODY	--	--	--	-0.0761**	-0.0761**
HARDWARE					
POWER	--	--	--	-0.0143	-0.0136
EQUIPMENT					
AUDIO SYSTEM	--	--	--	-0.1847***	-0.1844***
EDGOOD	--	--	--	--	0.0221
Adjusted-R^2	0.026	0.225	0.443	0.527	0.526
N=	616	616	616	616	616

Notes: *** P<0.01; ** P<0.05; * P<0.1

Comparison of Findings from the Consumer Reports and Edmunds.com sites

The comparison in Table 5 suggests that the effects of the motivators are similar for both the sites. Thus, both the parameters for customer satisfaction are positive and highly significant at both the sites. The same is the case for the product life-cycle stage variables. One difference, however, is that the model year variables follow different patterns at the two sites. Thus, while the model year has a progressively smaller effect from the most recent to the least recent years at the Consumer Reports site, the same is not the case at Edmunds.com. Similarly, with regard to the body type variables, luxury and wagon types have higher word of mouth than other body types, while small cars are likely to generate less word of mouth at the Consumer Reports site. In contrast, at Edmunds.com, in addition to luxury models, sports and coupe body types are also likely to attract more word of mouth. Additionally, vans are less likely to be discussed at this site.

Turning to the physical characteristics of products, most of the effects are similar in terms of sign. Thus, for instance, at both sites, Engine Cooling, Electrical System, Body Hardware and Audio System have a negative sign while Suspension has a positive sign. The primary differences in the role of physical characteristics at the two sites are in how the Fuel System, Paint/Trim/Rust and Power Equipment also have significant effects at Consumer Reports. Additionally, Exhaust does affect word of mouth at Edmunds.com.

Thus, while there is a strong overlap at the two sites in terms of the critical, delight and indifference categories of attributes discussed previously, there are some differences as well. These differences could reflect those between the consumers attracted by the two sites. Consumers at Consumer Reports' site, for instance, are likely to place more importance on the Fuel System thus viewing it as a critical

attribute. Similarly, they are more likely to be interested in the looks of the car as indicated by the positive parameter for Paint/Trim/Rust and Power Equipment which fall into the delight attributes category at this site but not at Edmunds.com. Edmunds.com's visitors, on the other hand, see the Exhaust system as a critical attribute while those at Consumer Reports' site do not.

Table 5. Comparison of the Findings for Consumer Reports and Edmunds.com

	Consumer Reports (Model 5)	Edmunds (Model 4)
Intercept	-8.1564***	-6.0777***
CS	0.0203***	0.0168***
CS^2	0.0005**	0.0008***
HIS	-0.0426***	-0.0601***
NEW	0.3749***	0.3977***
2006MODEL	0.9146***	0.9439***
2005MODEL	0.9144***	0.9799***
2004MODEL	0.4711***	1.3074***
2003MODEL	0.2640**	1.0148***
2002MODEL	0.2163**	0.7184***
PICKUP	-0.0050	0.0322
VAN	0.0959	-0.3099**
SPORTS	0.1068	0.9027***
LUXURY	0.4979***	0.7701***
SMALL	-0.3550**	-0.1355
LARGE	-0.0441	-0.1321
FAMILY	-0.0522	0.0358
COUPE	-0.0676	0.5061*
WAGON	0.2644*	0.1810
ENGINE COOLING	-0.0789**	-0.0807**
TRANSMISSION	0.0292	0.0384
DRIVE SYSTEM	0.0205	0.0061
FUEL SYSTEM	-0.0543*	0.0104
ELECTRICAL SYSTEM	-0.0723**	-0.0674**
CLIMATE SYSTEM	0.0171	0.0309
SUSPENSION	0.0560*	0.0702**
BRAKES	-0.0055	-0.0061
EXHAUST	-0.0188	-0.0653**
PAINTTRIMRUST	0.0669**	0.0386

BODY HARDWARE	-0.1127***	-0.0761**
POWER EQUIPMENT	0.0777**	-0.0143
AUDIO SYSTEM	-0.1176***	-0.1847***
CRGOOD	0.6284***	---
CRBAD	0.0528	---
EDGOOD	---	---
Adjusted-R^2	0.463	0.527
N=	616	616

Notes: *** P<0.01; ** P<0.05; * P<0.1

Another major difference between the Edmunds and Consumer Reports appears to be in terms of the model fits. The customer satisfaction model (model 1) has a much smaller R-square for the Edmunds data. In fact, a comparison of all the five models for the Edmunds.com site suggests that most of the explanation of the volume of word of mouth at this site is provided by the product attribute variables. Model fit increases from just 0.03, for the model with customer satisfaction only, to 0.23 for the specification that includes product life cycle stage variables as well. The adjusted R-square again increases and almost doubles with the inclusion of the product type variables.

Overall, however, the results from the two sites are quite similar and suggest that product life cycle stage, and product type, are strong extrinsic motivators in generating consumer word of mouth online.

5. Summary of Findings and Managerial Implications

5.1 Primary Findings

Our empirical analysis of word of mouth data, related to cars, from two different sites leads to similar conclusions. Overall, our results suggest that while intrinsic motivators do play a strong role in generating word of mouth, extrinsic motivators such as the product's life cycle stage and its attributes play a stronger role. Additionally, we find that, of the three extrinsic motivators, the product's life cycle stage and product attributes have the largest influence. Specifically, we find that newer products are discussed more than older ones. Our findings also provide some interesting managerial implications both for managing word of mouth campaigns and for product design.

5.2 Managerial Implications for Managing Word of Mouth Campaigns

Our empirical findings regarding the extrinsic motivators that we consider provide several implications for managing word of mouth campaigns.

(1)Stage of the product in its lifecycle: Our finding that newer products are likely to attract more word of mouth suggests that product manufacturers must redesign and launch newer versions of their

products, as frequently as commercially viable, to generate consumer word of mouth[1].

(2)Product attributes – body type: As discussed previously, our empirical results suggest that some models – such as luxury – are likely to be discussed more than other types of vehicles. Managerially, this implies that auto manufacturers should include such models in their product mixes as consumer word of mouth regarding these models could generate a broader awareness and interest in the brand. In other words, such models should be used as the word of mouth leaders by manufacturers

(3)Product attributes – physical characteristics: Our results indicate that certain product attributes are more likely to attract word of mouth from consumers than others. Manufacturers should make such attributes more salient in their promotion campaigns and communicate their products' strengths on those characteristics to consumers. Such tactics can stimulate consumer discussions of the attributes and, hence, word of mouth.

(4)Expert Opinions: As discussed earlier, positive opinions from experts stimulate consumer word of mouth although the effect is not as strong as that of the product's life cycle stage or its' physical attributes. Getting experts to review the product and gaining positive reviews can thus be helpful in increasing consumer word of mouth.

5.3 Managerial Implications for Product Design

As discussed previously, our results suggest that the attributes of a product can fall into one of three categories in terms of their effect on the volume of word of mouth: those in category one are *critical* attributes that increase word of mouth if the product does not perform well on them; category two consists of *indifference* attributes that do not affect the volume of word of mouth; finally, category three includes *delight* attributes that increase word of mouth if the product performs well on them.

Our classification provides several managerial implications. First, manufacturers should gain a clear understanding of which category each of their attributes belongs to. Such an understanding could be obtained using our approach, i.e., by investigating the relationship between the volume of word of mouth and customer satisfaction levels on specific attributes. Insights regarding which category each attribute belongs to should then be translated into ensuring appropriate levels of performance for each attribute. Thus, the product's design and production should be devised around the objective of ensuring that all attributes that fall into the critical category perform exceptionally well even if this results in higher costs and, hence, higher prices. For instance, in the case of automobiles, engine cooling, electrical system, body hardware and audio systems have to be of exceptional quality since our results suggest that they are critical attributes. We note that most of these attributes are functional or utilitarian in nature in that they affect the performance of the car.

In contrast to the critical attributes, where exceptional performance is necessary to avoid negative word of mouth, superior performance on the delight attributes can increase positive word of mouth. Such

[1] This result, however, does not explicitly address the question of how new a product should be in order to be an effective stimulant for word of mouth. We therefore suggest this as a useful avenue for future research.

positive communications from consumers can help products gain substantial credibility with potential customers as suggested by the Comscore (2007) findings that many of the online consumers who read product reviews by other consumers are influenced by those reviews in their purchase decisions. Manufacturers should therefore understand what attributes of their product fall into the *delight* category and deliver strong performance on those attributes if they desire to generate positive word of mouth. In the case of cars, therefore, our findings suggest that auto manufacturers should please their customers on attributes such as paint and trim and power equipment such as power doors, power seats and power sun and moon roofs. In contrast to the utilitarian nature of the critical attributes, the attributes that belong to the delight category seem to be more hedonic in that the performance of the car itself is not affected by the quality of these attributes although the consumer's overall experience is.

One interesting generalization, based on the type of attributes that fall into the critical and delight categories, seems to be that product manufacturers should deliver strong performance on the utilitarian attributes of their products to minimize negative word of mouth. If they do deliver exceptional performance on the delight attributes as well, they are likely to generate large volumes of positive word of mouth from consumers.

References

Comscore. (2007). *Online Consumer-Generated Reviews Have Significant Impact on Offline Purchase Behavior*. Press Release, November 29, 2007.

Dellarocas, C. (2003). The Digitization of Word-of-Mouth: Promise and Challenges of Online Feedback Mechanisms. *Management Science*, *49*(10), 1407-1424.

Dellarocas, C., & Ritu, N. (2006). A Statistical Measure of a Population's Propensity to Engage in Post-Purchase Online Word of Mouth. *Statistical Science, 21*(2), 277-285.

Godes, D., Dina, M., Yubo, C., Sanjiv, D., Chrysanthos, D., Bruce, P., … Peeter, V. (2005). The Firm's Management of Social Interactions. *Marketing Letters, 6*(3/4), 415-428.

Hennig-Thurau, T., Kevin, P. G., Gianfranco, W., & Dwayne, D. G. (2004). Electronic Word-of-Mouth Via Consumer-Opinion Platforms: What Motivates Consumers to Articulate Themselves on the Internet. *Journal of Interactive Marketing, 18*(1), 38-52.

Pitt, L. E., Pierre, R. B., Richard, T. W., & George, M. Z. (2002). The Internet and the Birth of Real Consumer Power. *Business Horizons, 45,* 7-14.

Ratchford, B., Myung-Soo, L., & Debabrata, T. (2003). The Impact of The Internet on Information Search for Automobiles. *Journal of Marketing Research, 40*(2), 193-209.

Swan, J. E., & Oliver, R. L. (1989). Postpurchase Communications by Consumers. *Journal of Retailing, 65*(4), 516-533.

Endnotes

[1] This result, however, does not explicitly address the question of how new a product should be in

order to be an effective stimulant for word of mouth. We therefore suggest this as a useful avenue for future research.