

How Product Attributes and Innovativeness Affect the Volume of Electronic Word of Mouth?

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We empirically test a theory to explain the volume and type of electronic word of mouth. Our results suggest that utilitarian attributes are the primary determinants of negative word of mouth in that, if products are not satisfactory on those attributes, consumers are likely to express their unhappiness to other consumers. Hedonic attributes are primarily responsible for positive word of mouth in that, if they are pleased with the performance of products on those attributes, consumers are likely to discuss the positive aspects of the products. In addition, innovativeness can lead to both negative and positive word of mouth.

INTRODUCTION

Before the era of the Internet, word of mouth was typically defined as face-to-face, and oral, form of interaction by two individuals. Today, however, word of mouth is also electronic and can happen in many formats such as “Web-based opinion platforms, discussion forums, boycott Web sites, news groups” (Hennig-Thurau et al 2004). 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 (Pitt et al. 2002).

Given its rising importance and influence on consumer behavior, firms need to understand and manage electronic word of mouth to benefit from the phenomenon. As pointed out by Godes et al (2005), a critical step in managing such social interactions between consumers is to understand the factors that affect them. The marketing literature has indeed examined the effects of factors such as self-involvement (Dichter 1966) and opinion leadership (Feick and Price 1987, Jacoby and Hoyer 1981) extensively in the context of traditional word of mouth. Recently, such factors have been investigated in the context of electronic word of mouth as well (Hennig-Thurau et al. 2004, Phelps et al. 2004, Gruen et al. 2006, Tirunillai and Tellis 2017).

In contrast to the extensive literature on the role of consumer traits such as involvement and the desire for opinion leadership, there have been few investigations of product-related stimulants of consumer word of mouth. Few studies (e.g., Chung and Darke 2006, Kostyra et al 2016), for instance, have examined the role that factors such as the product’s attributes can play in generating electronic word of mouth. This is, clearly, a major gap.

In this research, we investigate the effects of product-related stimulants on consumer word of mouth. Specifically, we investigate the relative influence of utilitarian and hedonic product attributes in generating consumer word of mouth. Our findings show that products that perform well on hedonic

attributes stimulate positive word of mouth. Products that don't perform well on hedonic attributes, however, do not generate negative word of mouth. The situation, however, reverses for utilitarian attributes. Products that do not perform well on utilitarian attributes stimulate negative word of mouth, and products that do perform well on utilitarian attributes do not necessarily stimulate positive word of mouth.

We also consider the role of innovativeness which has been linked to emotions through its ability to surprise consumers (e.g., Derbaix and Vanhamme 2003). The effects of surprise on arousal and word of mouth have also been discussed and demonstrated in the literature (Westbrook and Oliver 1991; Oliver et al 1997). We find out that innovative products generate more word of mouth than products that are not innovative.

We next provide the theoretical background for our research. We then describe the data that we use for our investigation. Next we present our empirical approach and discuss our results. We conclude with a section summarizing our findings, providing their managerial implications.

THEORY FRAMEWORK

We build our theoretical framework on the following components: (1) attribute type (2) consumption goals (3) emotional consequences of consumption (4) arousal effects of emotions (5) word of mouth effects of arousal and (6) innovativeness.

Attribute Type - Hedonic vs. Utilitarian

Utilitarian attributes "refer to the functional, instrumental and practical benefits" (Chitturi et al 2008) of products. Hedonic attributes, on the other hand, are those that can enhance the consumer's experience in using the product but are not necessary for its core functions.

Consumption Goals

Higgins (1997) suggests that consumers expect products to fulfill two types of goals. Prevention goals are those that have to be met. For instance, a car should brake well under most conditions and a cell phone has to be available for use whenever one needs to make a call. Prevention goals are therefore best met by the utilitarian attributes of products. Promotional goals, on the other hand, are those that a consumer would enjoy or aspire for but are not necessary for the functioning of a product. The shape and color of a cell phone or the acceleration of a car are examples of product benefits that would address promotional goals. Consumers rely on the hedonic attributes of products to meet their promotional goals.

Emotional Consequences of Consumption

As proposed and successfully demonstrated by Chitturi et al (2008), failing to meet and meeting or exceeding consumers' prevention and promotion goals have very different emotional consequences. A product that fails to meet a consumer's prevention goals generates anger. Since prevention goals are met by a product's utilitarian attributes, this means that utilitarian attributes that fail to satisfy consumers' prevention goals evoke anger. Meeting or exceeding prevention goals, however, results in satisfaction. Thus, utilitarian attributes that help the customer meet his prevention goals lead to satisfaction. Overall, therefore, utilitarian attributes of products can either result in customer anger or satisfaction.

Products that meet or exceed promotional goals delight the customer (Chitturi et al 2008). Those that fail to satisfy promotional goals, however, lead to customer dissatisfaction. Since promotional goals are addressed by hedonic attributes, this means that the hedonic attributes of products can either delight the customer or leave him dissatisfied.

Arousal Effects of Emotions

The three types of emotions that are possible consequences of consumption – satisfaction/dissatisfaction, anger and delight – are associated with different intensities of feelings. Satisfaction/dissatisfaction is associated with feelings and thoughts that are low on arousal (Oliver et al. 1997). In contrast, both anger and delight are associated with feelings that are intense and are, therefore,

high in their arousal effect on the consumer (Chitturi et al. 2008). Arousal plays a critical role in consumer word of mouth since only those emotions that are high in arousal stimulate the consumer to discuss the product and his experiences with others. Thus, satisfaction and dissatisfaction, which are low on arousal, do not lead to word of mouth while both anger and delight do.

Word of Mouth Effects of Arousal

While both anger and delight stimulate the consumer to share his experiences, the nature of the consequent word of mouth is clearly going to be quite different. Anger leads to negative word of mouth while delight leads to positive word of mouth. Thus, in the context of hedonic and utilitarian attributes, hedonic attributes are more likely to generate positive word of mouth if products excel on them while utilitarian attributes can generate negative word of mouth if the product does not perform well on those attributes.

Overall, we expect that satisfying consumers on utilitarian attributes does not generate positive word of mouth while not pleasing them on those attributes results in negative word of mouth. On the other hand, pleasing consumers on hedonic attributes leads to positive word of mouth but that not doing so does not stimulate negative word of mouth.

Innovativeness

While it has multiple components, the key element of Chitturi et al's (2008) theory is the arousal effects of emotions. It is arousal that eventually determines whether word of mouth occurs. Findings in the literature (Derbaix and Vanhamme 2003) suggest that a product's innovativeness can stimulate surprise which can then generate positive or negative word of mouth. These findings are consistent with those in the earlier literature (Oliver et al. 1997) that suggest that arousal, in fact, is itself "a function of the surprisingness of consumption" (Oliver et al. 1997). Additionally, the emotion of delight itself is also "a function of surprising consumption, arousal and positive affect." (Oliver et al. 1997). Thus, products that are innovative and provide pleasant surprises can delight and arouse the customer and generate positive word of mouth. Clearly, innovative products can provide unpleasant surprises as well (Janakiraman et al 2003) resulting in consumer anger and negative word of mouth. Given its potential to affect word of mouth, not accounting for the role of a product's innovativeness on consumer word of mouth in an empirical analysis could also transfer its influence to the estimated effects of the product's attributes. This would result in an inflation of their effects.

DATA

Our data comes from three major sources: the online sites of Consumer Reports magazine (www.consumerreports.org), J.D. Power and Associates (www.jdpower.com) and Automotive News magazine (www.autonews.com).

Measures of Word of Mouth

We collect this data from the online site of Consumer Reports. The consumer review feature of this site was launched in early 2004. Currently, the site's visitors can review any make and model of car sold in the US from the year 2000 to date (2017).

We use the number of reviews posted on a particular make, model and year – for example, Honda Accord 2005 - as a proxy for the volume of word of mouth about that model year. Similar proxies have been used in a number of studies on word of mouth (e.g. Dellacrocas and Narayan 2006; Liu 2006). In all, we collect data on the volume of word of mouth for 1024 model varieties from 36 brands. We denote this variable as TWOM in our analysis. Among the collected reviews, we use the number of reviews rating a model year as a 5 as the measure of the volume of positive word of mouth. We are more conservative in the designation of a review as positive because empirical evidence (Chevalier and Mayzlin 2006) suggests that consumer reviews tend to be overwhelmingly positive. We, therefore, designate a review as positive only if the reviewer gives the highest possible rating to a car. On the other hand, ratings that are extremely negative or close to being extremely negative both designated as negative ratings.

Measures of Consumer Assessments of Utilitarian Attributes

We collect data on two measures of consumers' assessments of the utilitarian attributes of models for which we compile the word of mouth data. The first, labeled, Reliability, is a measure of the assessed reliability of the model and the second, Quality, represents consumer assessments of quality.

Reliability

The National Research Center of the Consumer Reports organization conducts an Annual Auto Survey which covers about 1.4 million vehicles across ten model years (Consumer Reports 2009). Respondents to the survey report on problems with their vehicles, that they considered serious, because of cost, failure, safety, or downtime. The problems reported cover utilitarian attributes such as engine, transmission or the drive system. The responses are then aggregated into a reliability score ranging from 5 ("better") to 1 ("worse") for each model. We use this score as a proxy for consumers' assessments of the utilitarian attributes of models. We denote this score as Reliability.

Quality

J.D. Power and Associates conducts an Initial Quality Study (IQS) regarding consumer assessments of the quality of different model varieties. Consumers can report on problems ranging from relatively small malfunctions to complete breakdown of the car. Consumers respond on a scale anchored at 2 at the low end to 5 at the high end with the units of the scale increasing in increments of 0.5. This rating has been used often in the marketing literature (e.g. Srinivasan et al. 2009; Pauwels et al. 2004). We collect these ratings as well for all the model varieties in our data as a variable labeled Quality. A key difference between Quality and Reliability from the Consumer Reports reliability data is that it represents consumer assessments of quality in the short term while the latter captures assessments over the long run.

Measures of Consumer Assessments of Hedonic Attributes

Performance/Design

J.D. Power and Associates conducts an Automotive Performance, Execution and Layout (APEAL) study and reports a score ranging from 5 ("among the best") to 2 ("the rest") for each model. This score represents consumer assessments of overall performance and design, comfort and style of cars. We therefore use this score as a measure of consumers' assessments of hedonic attributes and label it as Performance/Design. Similar to the ratings of quality, consumers enter their scores on this variable as well on a scale of 2 to 5 increasing in increments of 0.5.

Innovativeness

We use two measures of innovativeness. The first, denoted Newness, captures whether a model is new. We include three types of new products under our definition of new: (1) a model that introduces a new type of car to the US Auto Market – for instance, the introduction of the first hybrid car (2) a model that is new to the manufacturer even if it is not new to the market – the recent launch of the Honda Insight would be an example and (3) a new design of an existing model – the introduction of the third generation of the Prius brand by Toyota is an example of this type of a new product.

Our second measure of innovativeness is the life cycle stage of the model. This variable, labeled Stage, represents the number of years for which the model was in the US car market. Some model varieties had a very long history in our data. The Infiniti G, for example, was introduced in 1991. It thus had a 15 year history by the time the 2005 Infiniti G was launched. Honda Pilot, on the other hand, was introduced in 2003 and, therefore, only had a two year history by the time the 2005 Honda Pilot was launched.

Product Heterogeneity

Recent findings suggest that the volume of word of mouth can vary across different product segments within a product category (Liu 2006). Such effects of product heterogeneity could be even more pronounced in the car market because of the large differences between different product segments in

terms of body styles and prices of different makes. We, therefore, collect data on the body style and price of each model and include them in our analyses. The body style data is from Consumer Reports which classifies cars into eleven styles: SUV, pickup, van, sports, luxury, convertible, small, large, family, coupe and wagon. We collect data on the manufacturer’s pricing of each model from the J. D. Power and Associates site.

Brand Heterogeneity

Some brands are more likely to generate consumer word of mouth than others. As in the case of product heterogeneity, not accounting for such potential differences between different brands of automobiles could potentially bias the estimated effects of product attributes and innovativeness on word of mouth. We, therefore, turn to the annual rankings of brand value published by Business Week magazine (Business Week 2007). This annual report provides a list of the hundred most valuable brands based on the role of the brands’ “intangible assets” in generating sales. We use this list to construct a binary variable, labeled Top Brand.

Dynamic Variations

The volume of consumer word of mouth can vary over time due to factors unrelated to product attributes (Bao and Chang 2018). For instance, Liu (2006) reports that word of mouth for movies can be quite high even before their release and follows a pattern of peaking during the week of release and tapering off during subsequent weeks. Auto manufacturers, typically consider each year as a new model year and, even if there are no changes in the features of a model, announce the availability of new-year models. We, therefore, also record the year of the model for which we collect word of mouth data and include the model year as a variable in our analyses.

Sales

The sales of different brands and models vary widely in the auto category. An analysis of the volume of word of mouth for each model without accounting for such differences in sales between models could lead to erroneous conclusions. We therefore normalize our word of mouth variables for each make, model and year by its total sales and use the resulting proportions as our dependent variables. The sales data are collected from Automotive News magazine. Tables 1-2 present the summary statistics for all the variables.

TABLE 1
SUMMARY STATISTICS FOR MODEL VARIABLES

	Mean	Std. Dev.
Proportion of total wom	0.00040	0.00059
Proportion of positive wom	0.00026	0.00041
Proportion of negative wom	0.00003	0.00006
Reliability	3.161	1.283
Quality	3.402	0.925
Performance/Design	3.375	0.911
Price	30908	15056
Stage	7.400	5.803
	Number of Observations	Number of Observations as a Percent of the Total Sample
Newness	194	18.945
Top brand	461	45.020

TABLE 2
CORRELATION MATRIX OF MODEL VARIABLES

		1	2	3	4	5	6	7	8
1	Proportion of total wom	1.000							
2	Proportion of positive wom	0.951	1.000						
3	Proportion of negative wom	0.501	0.341	1.000					
4	Reliability	0.146	0.204	-0.205	1.000				
5	Quality	0.002	0.070	-0.200	0.345	1.000			
6	Performance/Design	0.173	0.231	0.074	0.050	0.410	1.000		
7	Price	0.066	0.098	0.099	-0.115	0.282	0.647	1.000	
8	Stage	-0.109	-0.100	-0.104	0.150	0.178	-0.055	0.028	1.000

MODEL

Since our response variables are proportions, we use a Binomial response model with a Logit link (Greene 2003) for our analysis. Formally, our model is specified as:

$$y_i | \pi_i \sim \text{Binomial}(n_i, \pi_i), \text{ where} \tag{1}$$

$$\log \text{it}(\pi_i) = \beta' x$$

In (1), y_i is the observed proportion of word of mouth for car model i , π_i is the expected proportion, x_i is the set of covariates used to explain π_i and β is a vector of parameters that relates the covariates to the response proportion. n_i is the total annual sales of car model i .

Our data has a nested structure with three levels: brand, brand-model and brand-model-year. The first level represents the parent brand of the car. For example, it could be Acura, Chrysler, Ford or Honda. Level two includes models of the parent brand such as the Acura RDX, the Chrysler Sebring, Ford Mustang and Honda Accord. Finally, level three represents the model year which is the unit at which our sales data are recorded.

We could analyze consumer word of mouth at the brand, brand-model or the brand-model-year level. Our word of mouth data is at the brand-model-year level. Analyzing the data at this level, without accounting for brand and model similarities, however, may not be appropriate since the model-years within a model share a common model name and the models within a brand share a common brand name. Thus, for instance, within the Honda brand, Honda Accord and Honda Civic share a common brand name that may influence consumer word of mouth. Similarly, within the same brand model, Honda Accord for example, 2002 Honda Accord and 2003 Honda Accord have a similar body style and, clearly, share many other features. Our analysis will, therefore, need to account for these similarities. Appropriate for the analysis of such data is the multilevel regression model (Goldstein 2003) or HLM (Raudenbush and Bryk 2001), which accounts for the lack of independence across different cases for some variables, and thus overcomes the limitations of traditional methods of analyzing nested data. This multilevel modeling approach (Raudenbush and Bryk 2001) has been used extensively in the education literature and has recently been used in the marketing literature as well (Jong et al. 2004, Mittal et al 2008). We therefore re-formulate the specification in (1) as the following three-level model which separates the covariates into three categories, i.e., brand, brand-model and brand-model-year and introduces random components for the brand-level and brand-model levels into the link function:

$$y_{ijk} | \pi_{ijk} \sim \text{Binomial}(n_{ijk}, \pi_{ijk}), \text{ where} \tag{2}$$

$$\log \text{it}(\pi_{ijk}) = \mu + \alpha' v_k + \gamma' w_{jk} + \beta' x_{ijk} + \eta_{jk} + \varepsilon_k$$

In this formulation, the subscript k is for the brand, j is for the model and i is for the year of the model.

- π_{ijk} = expected proportion of word of mouth at the brand-model-year level
- y_{ijk} = observed proportion of word of mouth at the brand-model-year level
- n_{ijk} = total sales of the year i version of model j of brand k
- v_k = covariates at the brand-level
- w_{jk} = covariates at the brand-model level
- x_{ijk} = covariates at the brand-model-year level
- ε_k = random component at the brand level
- η_{jk} = random component at the brand-model level

We assume that the random components at both levels are distributed normally with level-specific variances, i.e. $\eta_{jk} \sim N(0, \sigma_\eta^2)$; and $\varepsilon_k \sim N(0, \sigma_\varepsilon^2)$.

All the variables in our data can now be mapped into each of the three levels based on whether they vary only across brands, across brands and models or across brands, models and model years. Thus, Top Brand is the sole brand-level covariate. The eleven body style classifications, such as Family, Small, Coupe, from Consumer Reports would be the covariates at the brand-model level. All of the other variables in our data, i.e., measures of consumer assessments of the utilitarian and hedonic attributes of cars, variables representing innovativeness, price and model year would be at the brand-model-year level since these variables vary across every brand, model and year.

We calibrate our model separately for total word of mouth, positive word of mouth and negative word of mouth. We next present and discuss our empirical results.

EMPIRICAL RESULTS

We calibrate the model separately on the volumes of positive and negative word of mouth. Estimates of the model's parameters for positive word of mouth are presented in Table 3 and those for negative word of mouth are in Table 4. The two tables also include the estimated values of model parameters when the two innovativeness variables – newness and stage – are dropped from the model.

TABLE 3
MODEL ESTIMATES FOR POSITIVE WORD OF MOUTH AT THE
CONSUMER REPORTS SITE

Variables	With Innovativeness		Without Innovativeness	
	Estimate	Std. Err.	Estimate	Std. Err.
(Intercept)	-11.080**	0.210	-11.2**	0.224
<i>Model version level</i>				
Reliability	0.001	0.017	-0.049**	0.017
Quality	0.020	0.017	-0.028*	0.017
Performance/Design	0.305**	0.031	0.489**	0.027
Newness	0.314**	0.027		
Stage	-0.314**	0.043		
Price	-0.074	0.052	-0.211**	0.056
2002 Model	0.277**	0.046	0.245**	0.046
2003 Model	0.508**	0.047	0.454**	0.045
2004 Model	0.709**	0.048	0.608**	0.044
2005 Model	1.311**	0.050	1.165**	0.043
2006 Model	1.147**	0.054	0.920**	0.044
2007 Model	0.523**	0.063	0.259**	0.050
<i>Brand model level</i>				
Coupe	0.255	0.303	0.288	0.350
Convertible	1.018**	0.221	1.125**	0.254
Luxury	0.479**	0.181	0.52**	0.207
Sporty	0.623**	0.193	0.463*	0.223
Large	0.395	0.233	0.274	0.268
Small	0.079	0.174	0.020	0.202
Pickup	-0.062	0.198	0.139	0.228
SUV	0.243	0.143	0.483**	0.161
Van	0.140	0.194	0.247	0.223
Wagon	0.533*	0.270	0.995**	0.308
<i>Brand level</i>				
Top brand	0.387	0.217	0.328	0.225
<i>Random effects</i>				
Brand model level	0.299**	0.034	0.424**	0.046
Brand level	0.282**	0.083	0.288**	0.090

TABLE 4
MODEL ESTIMATES FOR NEGATIVE WORD OF MOUTH AT THE
CONSUMER REPORTS SITE

Variables	With Innovativeness		Without Innovativeness	
	Estimate	Std. Err.	Estimate	Std. Err.
(Intercept)	-10.260**	0.350	-10.57**	0.358
<i>Model version level</i>				
Reliability	-0.237**	0.038	-0.29**	0.037
Quality	-0.101*	0.046	-0.184**	0.046
Performance/Design	-0.017	0.070	0.226**	0.065
Newness	0.510**	0.069		
Stage	-0.138**	0.052		
Price	0.100	0.078	-0.017	0.083
2002 Model	0.169	0.100	0.196*	0.100
2003 Model	0.127	0.104	0.131	0.104
2004 Model	0.096	0.106	0.098	0.105
2005 Model	0.438**	0.105	0.444**	0.103
2006 Model	0.393**	0.106	0.322**	0.102
2007 Model	-0.054	0.124	-0.070	0.119
<i>Brand model level</i>				
Coupe	0.186	0.419	0.150	0.442
Convertible	0.185	0.365	0.267	0.378
Luxury	0.490*	0.228	0.491*	0.239
Sporty	0.464	0.248	0.351	0.262
Large	0.029	0.314	-0.072	0.334
Small	0.156	0.202	0.165	0.218
Pickup	-0.465	0.245	-0.348	0.259
SUV	0.264	0.172	0.385*	0.179
Van	0.683**	0.217	0.799**	0.233
Wagon	0.291	0.321	0.556*	0.335
<i>Brand level</i>				
Top brand	0.212	0.247	0.166	0.238
<i>Random effects</i>				
Brand model level	0.224**	0.045	0.281**	0.053
Brand level	0.346**	0.108	0.306**	0.101

Role of Hedonic Attributes

The performance/design variable in our model represents hedonic attributes. As shown in the Table 3, the estimated parameter for performance/design is positive and statistically significant at better than the 0.01 level of significance. This finding suggests that pleasing consumers on hedonic attributes leads to positive word of mouth. On the other hand, as shown in Table 4, the effect on the volume of negative word of mouth is not significant, which means that products that do not please customers on hedonic attributes are unlikely to have an increase in negative word of mouth.

Role of Utilitarian Attributes

The two variables – Reliability and Quality – represent utilitarian attributes in our model. According to our theory, displeasing consumers on utilitarian attributes should result in an increase in negative word of mouth. As shown in Table 4, the parameters for both variables are negative and significant in the negative word of mouth model. Since higher values of the two variables represent more positive customer assessments of reliability and quality, the negative estimates suggest that improvements in these two attributes decrease the volume of negative word of mouth. Conversely, poor performance on quality and reliability increase the volume of negative word of mouth. On the other hand, as shown in the Table 3, the estimates of these two variables in the positive word of mouth analysis are not statistically significant thus implying that pleasing customers on utilitarian attributes are unlikely to increase the volume of positive word of mouth.

Role of Innovativeness in Word of Mouth

We expect that innovativeness in products is likely to result in an increase in word of mouth. Therefore, we calibrate our model on the total volume of word of mouth. The results are presented in Table 5.

The estimate for the effect of Newness on the total volume is positive and statistically significant. Recalling that we operationalized Newness as a binary variable, with 1 indicating a new model, the estimated effect suggests that new products will have higher volumes of word of mouth than other products. This finding is reinforced by the estimate for the Stage variable as well. The effect is negative and significant. Since Stage represents the number of years for which a model has been in the market, the negative estimate suggests that older models are likely to have lower volumes of word of mouth than newer ones. In addition, the estimated effects of Newness and Stage in Table 3 indicate that increasing innovativeness leads to increased volumes of positive word of mouth, and parameters of Newness and Stage in Tables 4 also suggest that there is an increase in negative word of mouth with increasing innovativeness.

Overall, findings suggest that innovativeness can increase consumer word of mouth for products. The increase, however, can be both positive and negative. This is one of the principal findings in our paper.

Omitting Innovativeness on the Magnitude of Parameters

As discussed previously, omitting innovativeness may inflate the estimated effects of hedonic and utilitarian attributes. We test this statement by re-calibrating our model after dropping the two innovativeness variables. A comparison of the estimated effects of the two utilitarian attributes, Reliability and Quality, and the hedonic attribute, Performance/Design, across the *With Innovativeness* and *Without Innovativeness* specifications in all of these tables suggests that the magnitudes of the parameters are indeed larger when innovativeness is not included.

Estimated Effects of Heterogeneity and Between Brand/brand-model Variance

Regarding to product heterogeneity, brand heterogeneity and dynamic variations in word of mouth, a review of the estimates suggests that a substantial number of them have significant effects on word of mouth. Thus, for instance, all of the model year variables and the Convertible, Luxury and Sporty variables have significant parameters for positive word of mouth in Table 3. While a fewer number have significant effects in the case of negative word of mouth (Table 4), two of the model year variables (2005 Model and 2006 Model) and two of the Model variables (Luxury and Van) do have relatively large, significant, effects in the case of negative word of mouth (Table 4) as well. Taken together, these estimates provide clear evidence that it is critical to account for heterogeneity and dynamic effects in an analysis of the effects of product attributes on word of mouth. Finally, the brand and brand-model variance terms are both significant for all model calibrations thus supporting our use of the multi-level modeling approach.

TABLE 5
MODEL ESTIMATES FOR TOTAL WORD OF MOUTH AT THE
CONSUMER REPORTS SITE

Variables	With Innovativeness		Without Innovativeness	
	Estimate	Std. Err.	Estimate	Std. Err.
(Intercept)	-9.614**	0.177	-9.753**	0.190
<i>Model version level</i>				
Reliability	-0.072**	0.013	-0.118**	0.013
Quality	0.006	0.013	-0.040**	0.013
Performance/Design	0.230**	0.024	0.405**	0.021
Newness	0.301**	0.021		
Stage	-0.267**	0.036		
Price	-0.042	0.042	-0.156**	0.046
2002 Model	0.225**	0.032	0.199**	0.032
2003 Model	0.371**	0.033	0.323**	0.031
2004 Model	0.474**	0.035	0.388**	0.032
2005 Model	0.949**	0.038	0.825**	0.031
2006 Model	0.760**	0.042	0.565**	0.032
2007 Model	0.160**	0.049	-0.065*	0.038
<i>Brand model level</i>				
Coupe	0.135	0.252	0.138	0.297
Convertible	0.744**	0.185	0.826**	0.216
Luxury	0.392*	0.152	0.415**	0.177
Sporty	0.414*	0.160	0.263	0.189
Large	0.228	0.192	0.101	0.226
Small	0.119	0.143	0.085	0.169
Pickup	-0.034	0.163	0.148	0.191
SUV	0.211	0.118	0.413**	0.136
Van	0.317*	0.155	0.414*	0.183
Wagon	0.545*	0.225	0.953**	0.262
<i>Brand level</i>				
Top brand	0.297	0.208	0.247	0.213
<i>Random effects</i>				
Brand model level	0.213**	0.023	0.312**	0.033
Brand level	0.272**	0.075	0.273**	0.080

SUMMARY, MANAGERIAL IMPLICATIONS AND LIMITATIONS

Summary

We empirically test a theory to explain the volume and type of electronic word of mouth for products. Our theoretical framework includes the roles of utilitarian and hedonic attributes, and innovativeness, as a stimulant of word of mouth. We test the theory empirically on consumer word of mouth for 1024 brand-model-years across 279 models and 36 brands of automobiles over a seven year period. We find out that

utilitarian attributes are the determinants of negative word of mouth in that, if products do not satisfy them on those attributes, consumers are likely to express their unhappiness to other consumers. Satisfying consumers on these attributes, however, does not necessarily lead to positive word of mouth. Hedonic attributes, on the other hand, are responsible for positive word of mouth in that, if they are pleased with the performance of products on those attributes, consumers are likely to discuss the positive aspects of the products with other consumers. Not pleasing consumers on these attributes, on the other hand, is unlikely to stimulate negative word of mouth.

Product innovativeness plays a role that is different from that of product attributes both in its emotional origins and its outcomes. Specifically, innovativeness stimulates word of mouth through its ability to surprise consumers. This is in contrast to how utilitarian (hedonic) attributes stimulate negative (positive) word of mouth through anger (delight). In terms of its outcomes, as opposed to utilitarian and hedonic attributes, which can stimulate either negative or positive word of mouth, respectively, innovativeness can lead to both negative and positive word of mouth. Additionally, because of this dual effect, omitting innovativeness from an analysis of the role of product attributes in consumer word of mouth can lead to inflated and incorrect estimates of their effects.

Our research makes two important contributions to the literature. We demonstrate the external validity of Chitturi et al's (2008) theory regarding the role of product attributes in consumer word of mouth. Although our study is limited to automobiles, given the size and importance of this category (Srinivasan et al 2009) and the prevalence of consumer word of mouth regarding cars, we believe this is an important contribution. Second, we develop a theoretical framework that includes innovativeness as a key influencer of consumer word of mouth. Although innovativeness has been discussed previously in the context of word of mouth in the literature, a formal theory regarding its role has neither been proposed nor empirically tested previously in the context of electronic word of mouth.

Managerial Implications

Our findings suggest that auto manufacturers need to ensure that their products perform reliably on utilitarian attributes such as the transmission, brakes and steering. Products that fail to do so would suffer from negative consumer word of mouth. Interestingly, our findings also indicate that ensuring that products perform exceedingly well on these attributes will not be very helpful in terms of positive word of mouth. Thus, for instance, it may not be necessary to invest in ensuring that the transmission of a car stays reliable far longer than any of its competing brands. Managers will therefore need to have a good understanding of consumer expectations on utilitarian attributes and ensure that their products meet, and not necessarily far exceed, those expectations. The opposite, however, is the case for hedonic attributes where exceeding consumers' expectations for those attributes and delighting them stimulates positive word of mouth. Solely meeting consumers' expectations, or being on par with competing brands on such attributes, will however not be useful. Thus, investments made to ensure parity with competitors on hedonic attributes, will bring very little returns in terms of positive word of mouth.

A key finding of our results, perhaps, is regarding the role of innovativeness. Our findings provide strong evidence that innovativeness stimulates consumer word of mouth. Thus, manufacturers should invest in redesigning, improving and adding new features to their products as a means of generating consumer interest and word of mouth. One caution in our findings, however, is that innovativeness can lead to both positive and negative word of mouth. While we do not investigate the reasons why innovativeness can stimulate negative word of mouth, theory suggests that innovations that result in negative surprises (Janakiraman et al 2006) can lead to such responses. Manufacturers, therefore, need to ensure that product redesigns result in positive and not negative surprises.

Limitations

While they provide support to our theoretical framework, our results have some limitations. First, our empirical analysis is limited to a single category. While this category is important in terms of its size in the economy (Srinivasan et al 2009), the number and variety of competitors, and the extent of innovation

in the category, it is important to replicate our findings in other product categories to assess the generalizability of our theory across multiple categories.

Second, we do not fully account for other factors that can affect word of mouth. Many other factors may indeed be related to and influence word of mouth. For instance, extensive advertising may increase the awareness of new products, lower the extent of consumer surprise and reduce word of mouth. We should, therefore, include as many other stimulants (or, suppressants) of consumer word of mouth as possible to precisely measure the effects of hedonic and utilitarian attributes, and innovativeness, of interest in the proposed theory.

REFERENCES

- Bao, T., & Chang, T. L. (2018). Timing effects of opinion leader's electronic word of mouth. *International Journal of Internet Marketing and Advertising*, 12(1), 69.
- BusinessWeek (2007). *The 100 Top Brands*. Press Release, August 6, 2007.
- Chernev, A. (2004). Goal-Attribute Compatibility in Consumer Choice. *Journal of Consumer Psychology*, 14(1 & 2), 141-150.
- Chevalier, J.A., & Mayzlin, D. (2006). The Effect of Word of Mouth on Sales: Online Book Reviews. *Journal of Marketing Research*, 43(3), 345-354.
- Chitturi, R., Raghunathan, R., & Mahajan, V. (2008). Delight by Design: The Role of Hedonic Versus Utilitarian Benefits. *Journal of Marketing*, 72(3), 48-63.
- Chung, C. M.Y., & Darke, P. R. (2006). The consumer as advocate: Self-relevance, culture, and word-of-mouth. *Marketing letters*, 17(4), 269-279.
- Dellarocas, C., & Narayan, R. (2006). A Statistical Measure of a Population's Propensity to Engage in Post-Purchase Online Word of Mouth. *Statistical Science*, 21(2), 277-285.
- Derbaix, C., & Vanhamme, J. (2003). Inducing word-of-mouth by eliciting surprise – a pilot investigation. *Journal of Economic Psychology*, 24 (1), February, 99-116.
- Dichter, E. (1966). How Word of Mouth Advertising Works. *Harvard Business Review*, 44, 147-166.
- Feick, L. F., & L. L. Price (1987). The Market Maven - a Diffuser of Marketplace Information. *Journal of Marketing*, 51(1), 83-97.
- Goldstein, H. (2003). *Multilevel Statistical Models (Hardcover)*. Publisher: Wiley; 3 edition
- Godes, D., et. al. (2005). The Firm's Management of Social Interactions. *Marketing Letters*, 6 (3/4), 415–28.
- Greene, W. (2003). *Econometric Analysis*, 5th ed. Prentice Hall, Upper Saddle River, NJ.
- Gruen, T.W., Osmonbekov, T., & Czapslewski, A.J. (2006). eWOM: the Impact of Customer-to Customer Online Know-How Exchange on Customer Value and Loyalty. *Journal of Business Research*, 59(4), 449–456.
- Hennig-Thurau, T., Gwinner, K.P., Walsh, G., & Gremler, D.D. (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.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52, 1280-1300.
- Jacoby, J., & Hoyer, W.D. (1981). What if Opinion Leaders Didn't Know More? A Question of Nomological Validity, in *Advances in Consumer Research*, Kent B. Monroe, Ed. Vol. 8. Ann Arbor, MI: Association for Consumer Research.
- Janakiraman, N., Meyer, R.J., & Morales, A. C. (2006). Spillover Effects: How Consumers Respond to Unexpected Changes in Price and Quality. *Journal of Consumer Research*, 33, 361-69.
- Jong, A., Ruyter K., & Lemmink, J. (2004). Antecedents and Consequences of the Service Climate in Boundary-Spanning Self-Managing Service Teams. *Journal of Marketing*, 68(2), 18-35.
- Kostyra, D. S., Reiner, J., Natter, M., & Klapper, D. (2016). Decomposing the effects of online customer reviews on brand, price, and product attributes. *International Journal of Research in Marketing*, 33(1), 11-26.

- Liu, Y (2006). Word of Mouth for Movies: Its Dynamics and Impact on Box Office Revenue. *Journal of Marketing*, 70 (July), 74-89.
- Mittal, V., Feick, L., & Murshed, F. (2008). Publish and Prosper: The Financial Impact of Publishing by Marketing Faculty. *Marketing Science*, 27(3), 430-444.
- Oliver, R. L., Rust, R.T., & Varki, S. (1997). Customer delight: Foundations, findings, and managerial insight. *Journal of Retailing*, 73(3), 311-326.
- Pauwels, K., Silva-Risso, J., Srinivasan, S., & Hanssens, D. M. (2004). New Products, Sales Promotions, and Firm Value: The Case of the Automobile Industry. *Journal of Marketing*, 68(4), 142-156.
- Phelps, J. E., Lewis, R., Mobilio, L., Perry D., & Raman, N. (2004). Viral Marketing or Electronic W-O-M Advertising: Examining Consumer Responses to Pass Along Email. *Journal of Advertising Research*, 44(4), 333-348.
- Pitt, L. E., Berthon, P.R., Watson, R.T., & Zinkhan, G.M. (2002). The Internet and the Birth of Real Consumer Power. *Business Horizons*, 45(July-August), 7-14.
- Raudenbush, S.W., & Bryk, A.S. (2001). *Hierarchical Linear Models: Applications and Data Analysis Methods*. Sage Publications, Inc; 2nd edition
- Srinivasan, S., Pauwels, K., Silva-Risso, J., & Hanssens, D. M. (2009). Product Innovations, Advertising, and Stock Returns. *Journal of Marketing*, 73(1), 24-43.
- Sundaram, D. S., Mitra, K., & Webster, C (1998). Word-of-Mouth Communications: A Motivational Analysis. *Advances in Consumer Research*, 25, 527-531.
- Tirunillai, S., & Tellis, G. J. (2017). Does Offline TV Advertising Affect Online Chatter? Quasi-Experimental Analysis Using Synthetic Control. *Marketing Science*, 36(6), 862-878.
- Westbrook, R. A., & Oliver, R. L. (1991). The Dimensionality of Consumption Emotion Patterns and Consumer Satisfaction. *Journal of Consumer Research*, 18(1), 84-91.

APPENDIX

REPLICATION OF RESULTS ON DATA FROM EDMUNDS.COM

Although all of our expectations are supported by data from the consumerreports.org site, we wanted to test them once again on word of mouth data from a different site to assess the reliability of our results. We therefore collect data from a different site, www.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. Being able to replicate our findings on data from this site will therefore provide additional support for our theory. One limitation of this site, however, is that it is difficult to classify word of mouth here into positive and negative categories. We therefore only fit the model of total word of mouth on this data but calibrate two versions of this model, i.e., with and without innovativeness. Results for this calibration are presented in Table 6.

The estimated effects of Reliability, Quality, Performance/Design, Newness and Stage are very similar in both with and without innovativeness specifications for this data to the corresponding estimates for total word of mouth on the Consumer Reports data.

We can, however, test the results without including innovativeness. It is clear that the estimated effects of the utilitarian and hedonic attributes from the without innovativeness specification are larger in magnitude than the corresponding estimates from the specification with innovativeness.

TABLE 6
MODEL ESTIMATES FOR TOTAL WORD OF MOUTH AT EDMUNDS.COM

With Innovativeness			Without Innovativeness	
Variables	Estimate	Std. Err.	Estimate	Std. Err.
(Intercept)	-7.423**	0.179	-7.585**	0.193
<i>Model version level</i>				
Reliability	-0.113**	0.008	-0.187**	0.007
Quality	0.035**	0.008	-0.050**	0.007
Performance/Design	0.122**	0.015	0.393**	0.012
Newness	0.424**	0.012		
Stage	-0.334**	0.051		
Price	0.240**	0.030	0.017	0.031
2002 Model	0.636**	0.020	0.597**	0.019
2003 Model	0.896**	0.024	0.855**	0.019
2004 Model	1.075**	0.030	0.988**	0.018
2005 Model	0.757**	0.037	0.613**	0.020
2006 Model	0.725**	0.044	0.450**	0.021
<i>Brand model level</i>				
Coupe	-0.126	0.410	0.292	0.479
Convertible	0.871**	0.240	1.121**	0.279
Luxury	-0.101	0.180	-0.031	0.208
Sporty	0.746**	0.230	0.487*	0.268
Large	-0.077	0.250	-0.105	0.293
Small	0.501*	0.235	0.184	0.268
Pickup	-0.253	0.268	-0.206	0.314
SUV	-0.108	0.151	0.111	0.172
Van	-0.311	0.215	-0.154	0.251
Wagon	0.365	0.264	0.662*	0.305
<i>Brand level</i>				
Top brand	0.275	0.189	0.107	0.192
<i>Random effects</i>				
Brand model level	0.225**	0.030	0.317**	0.042
Brand level	0.179**	0.061	0.172**	0.066