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# The heterogeneous effect of WOM on product sales: why the effect of WOM valence is mixed?

Effect of WOM  
on product sales

1523

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## Abstract

**Purpose** – Previous literature on WOM has consistent findings on the positive and significant effect of WOM volume on product sales, but the literature on WOM valence has been mixed. In this study, the authors aim to explain the reason for the mixed effect of WOM valence on product sales by considering heterogeneous characteristics of products, especially in the movie market, by segmenting products into mainstream and non-mainstream movies.

**Design/methodology/approach** – This study uses empirical data from the motion picture industry, such as box office revenue, WOM volume and valence, and other variables of movie characteristics. The hypothesis is tested using OLS and panel data analysis in econometric methods.

**Findings** – The authors find a significant effect of WOM valence on box office revenue only in the case of non-mainstream movies, which have relatively smaller marketing budgets than mainstream movies. The findings suggest that as marketing communication channels become more diverse, with larger marketing budgets, the effect of online WOM valence on product sales can be diluted. In addition, it is found that the effect of WOM volume on box office revenue is greater for mainstream movies, suggesting that consumers build higher credibility on products with larger sales or WOM volume, especially for experience goods with uncertain quality.

**Practical implications** – The findings explain the weak relationship between WOM valence and product sales, which has been controversial in the WOM literature, and broaden the understanding of the effect of WOM on product sales.

**Originality/value** – The relationship between WOM valence and sales and, consequently, the revenue of a good has not been clearly understood, considering the heterogeneous characteristics of consumers in previous literature. In this study, it is found that WOM volume and valence have different effects on product sales, corresponding to differences in product category. The findings suggest a reason for the weak relationship between WOM valence and product sales, which has been controversial in the WOM literature.

**Keywords** Word of mouth, Word of mouth valence, Motion picture industry, Movie industry, Sales promotion, Consumer behaviour, Entertainment, Promotional methods

**Paper type** Research paper



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## Introduction

Previous literature has concluded that WOM has two important attributes: volume and valence (Mahajan *et al.*, 1984; Neelamegham and Jain, 1999). Volume refers to the total amount of WOM, and valence refers to the nature of the content of WOM, which could be positive, negative, neutral, or mixed. While WOM volume is usually reported as a significant factor that influences product sales (Chen *et al.*, 2004; Liu, 2006), the effect of WOM valence on product sale is debatable and there is no consensus of opinion. Some studies in the literature have reported that WOM valence is a significant factor in product sales (Chevalier and Mayzlin, 2006; Forman *et al.*, 2008; Godes and Mayzlin, 2004). On the other hand, there are also a number of previous studies that found no significant or direct effect of WOM valence on product sales, especially for the motion picture industry (Duan *et al.*, 2008; Liu, 2006).

Therefore, the purpose of this study is to explore how WOM affects the revenue of experience goods differently depending on the product characteristics, be they mass or niche products. In this study, mass products and niche products are operationally defined in terms of targeting market size. Mass products can be defined as the products targeting large market segments with greater marketing budgets and through corresponding diverse marketing channels. On the other hand, niche products can be defined as the products targeting relatively smaller or particular segment of market with smaller marketing budgets and consequently fewer marketing channels (Dalgic and Leeuw, 1994). We expect and find that the effect of WOM valence on sales is less significant for mass products compared to niche products, due to the greater market efforts and corresponding more diverse marketing channels of mass products. The results of this study will help broaden our understanding the role of product characteristics on the relationship between product sales and WOM.

In order to test our hypothesis, we empirically explore the movie industry because of its fast growing market size and corresponding richness of the data, such as product sales, entire product life cycles, WOM, etc. It was reported that spending on theatrical tickets in the USA was about \$9 billion (S&P, 2004), and \$3 billion for both theatrical and ancillary markets in South Korea in 2004 (Ministry of Culture, Sports, and Tourism, 2004). In addition, the large body of extant literature on WOM in the motion picture industry provides us with opportunities to compare our findings with previous ones, and gain a deeper understanding of the effect of WOM on product sales.

## Theoretical background

Previous literature on WOM has focused on the mechanism of building trust between buyers and sellers and its effect on product sales in the online market (Chen *et al.*, 2004; Chen and Xie, 2008; Dellarocas, 2003; Liu, 2006; Schubert and Ginsburg, 2000; Senecal and Nantel, 2004; Zufryden, 2000). These studies mainly focused on how WOM volume and valence affect sales, auction prices, number of bids, and the probability of sales. Although there have been consistent findings on the effect of WOM volume on product sales, findings on the effect of WOM valence has been mixed (Duan *et al.*, 2008; Liu, 2006). For example, Godes and Mayzlin (2004) found that the effect of WOM valence via the average star rating in online bookstores showed mixed results depending on the bookstores. They found a significant WOM valence effect on sales for Amazon.com, but no effect for bn.com Liu (2006) found that the volume of WOM helps explain aggregate and weekly box office revenue, but the valence had no significant

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explanatory power, in his exploration of the temporal relationship between user WOM and box office revenue. On the other hand, Duan *et al.* (2008) suggested that both a movie's box office revenue and WOM valence significantly influenced WOM volume and, in turn, WOM volume leads to higher box office performance. They characterized the process of WOM effect through a dynamic simultaneous equation system separating the effect of online WOM as both a precursor to and an outcome of retail sales.

However, these previous studies omitted the effect of other marketing communication channels on consumers' purchase decisions – such as TV, online and offline magazines and newspapers, user-generated content, offline WOM, etc. These information sources are also available to consumers and are easily accessible. Consequently, consumers' purchase decisions may depend on overall judgment based on the information from those various information sources. Therefore, we have to carefully consider the possibility that consumers' purchase decisions may depend on multiple information sources, and not just online WOM. It is highly likely that consumers search for product information from other information sources when their primary information source provides unsatisfactory or inadequate information (either quantity or quality) regarding the product (Case, 2007).

Mass market products, which have large marketing budgets, cause consumers to consider multiple sources of information available through various marketing channels such as TV, magazines, online and offline newspapers, and not just online WOM. Therefore, as marketing budgets becomes larger, more people will come across the information about mass products and are more likely to be persuaded by its advertisements. Consequently, the effect of online WOM on product sales will be diluted by the effect of other marketing sources. Considering the high correlation between marketing budget and product sales (Dekimpe and Hanssens, 1995), we need to count for the heterogeneous effect of online WOM on product sales, dependant on previous sales or marketing activities. This consumer decision mechanism of searching for additional information sources when confronted with limited information may influence the effect of both WOM volume and valence as the following.

#### *Volume of WOM*

Previous studies have suggested that the volume of WOM can predict the sales of products and have demonstrated this both theoretically (McFadden and Train, 1996) and empirically for various product categories including TV shows (Godes and Mayzlin, 2004) and motion pictures (Duan *et al.*, 2008; Liu, 2006). The reasoning behind WOM volume being a powerful predictor of product sales is that WOM volume increases the awareness about a product among consumers and leads to higher sales, and is also known as informative effect of WOM.

On the other hand, we also need to understand the additional effect of WOM volume in the perspective of information credibility. WOM volume inherently delivers information about how many other people experienced or used the product and how popular it has been in the market. Therefore, WOM volume can generate the credibility for the product and affect product sales[1]. This is because consumers, through knowledge of other consumer's experiences concerning a particular product, can reduce the uncertainty associated with the product (Banerjee, 1992; Bikhchandani *et al.*, 1992; Chen *et al.*, 2004). In other words, consumers build higher credibility on the

products with higher WOM volume, which increases consumers' willingness to buy (Grewal *et al.*, 1994; Harmon and Coney, 1982), especially for experience goods when the quality is uncertain.

If we consider the general assumption that mass product has a larger volume of WOM than niche product due to the differences in marketing budgets, we can expect that the effect of WOM volume for mass product on sales is larger than that of niche product. Thus, we suggest the following hypothesis for WOM volume:

- H1. The effect of WOM volume on product sales is positive and greater on mass product than niche product.

#### *Valence of WOM*

It is intuitive that the valence of WOM influences consumer choices since consumers tend to rely on what other consumers have done before in order to decrease the uncertainty associated with the decision making process (Banerjee, 1992). However, there is a very weak relationship between attitude and behavior of consumers with no significant relationship between the valence of WOM and product sales in the literature (Chen *et al.*, 2004; Duan *et al.*, 2008; Liu, 2006). There have been conflicting explanations for the low explanatory power of WOM valence on product sales.

Recently, Zhu and Zhang (2010) reported that the rating of online consumer reviews (WOM valence) is moderated by several factors including product and consumer characteristics. A similar explanation is found in the psychology literature which suggests the moderating role of environment and context on the effectiveness of an influencer (Hansen, 1976). Therefore, along with these previous studies, we expect that a variety of marketing channels can also moderate the effect of WOM on product sales.

There is a strong relationship between the variety of marketing channels used and product type (mass and niche products), since mass products generally target a large segment of the market with larger marketing budgets and through corresponding more diverse marketing channels, while niche products rely on fewer and lower cost marketing channels (Finn *et al.*, 2000; Kumar and Petersen, 2005). Therefore, from the perspective of product characteristics, we expect that the product type (mass or niche) will moderate the effect of WOM valence on product sales. Recently, Zhu and Zhang (2010) used product popularity as a moderating variable while analyzing the impact of WOM on video game consumption. However product type (popularity) is an ex post variable (after product introduction) and, as such, its explanatory power on the effect of WOM seems to be low. In addition, from a practical perspective, it is difficult for marketers to manipulate product information in real-time.

Based on our previous discussions on the role of marketing budgets and information sources, we can reasonably expect that products with smaller marketing budgets will lead consumers to depend more on WOM valence information, since consumers do not have enough information from other channels to determine product credibility (Chen *et al.*, 2004; Chen and Xie, 2008). Therefore, WOM valence is expected to significantly affect product sales for niche products, as potential consumers for these niche products are expected to depend to a greater extent on the available information sources, such as online portals, owing to the limited marketing budget. On the other hand, in the case of mass products, the use of diverse marketing communication channels with larger marketing budgets is expected to make consumers less dependent on WOM valence on online web sites. In other words, greater marketing efforts will

reduce the effect of WOM valence on product sales, while smaller marketing efforts will increase the effect of WOM valence. Thus, we suggest the following hypotheses for the relationship between the valence of WOM and product sales:

- H2. The effect of WOM valence on product sales is positive and greater on niche product than mass product.

**Data**

We collected data from the Korean Film Council (KOFIC) on 117 movies that were released in South Korea in 2006. These movies do not have missing observations and have a life-cycle longer than six-weeks[2]. Table I shows the summary statistics of the data used in this study. The data shows a high standard deviation and large differences between median and mean, implying that the movie market is highly heterogeneous in the aspects of box office revenue, number of moviegoers, volume of WOM messages, etc. The mean of WOM valence is 8.08 out of 10. The median percentage of positive critical reviews is 40 per cent, while the median percentage of negative critical reviews 0 per cent. This phenomenon matches that of the US market as found in the literature (Liu, 2006).

*Box office*

Weekly box office revenue has been collected from the KOFIC database. The KOFIC web site provides a search engine that gives information about movie releases, the number of moviegoers, box office revenue, the number of screens, and the box office rankings. Therefore, by using the release dates of movies, it is possible to calculate the weekly box office revenue of any movie released in South Korea.

*WOM and critical reviews*

The WOM and critical reviews were collected from a Korean web portal called NAVER, which has the highest market share in South Korea[3] and provides services similar to those of Yahoo!. Due to its high market share, the Movie Rating and Review board of NAVER is the most accessible and credible source of online movie information in Korea. The average number of ratings for a movie used in this study was about 743.

The Movie Rating and Review board of NAVER consists of three sections: ratings, reviews, and related articles, and we used only ratings for our analysis[4]. Each

Variable	Median	Mean	Std. Dev.
Box office (aggregate)	\$56,486	\$1,922,659	\$4,153,191
Box office (weekly)	\$5,049	\$313,772	\$902,884
Average number of critical reviews	5	5	3.08
Per cent of positive critical reviews	40	43	30.5
Per cent of negative critical reviews	0	14	20.3
Volume of WOM messages (weekly)	16	124	283
Valence of WOM messages	8.48	8.08	0.94

**Notes:** Total number of movies = 117. All currency used in this study is USD (1USD = 1300KRW helps to understand the amount)

**Table I.** Summary of critical reviews and WOM

message on the board has a rating for a movie using a number between one and ten along and short comments. The WOM volume is the number of messages; the WOM valence is the average rating of those messages on the board for a movie. A previous approach by Duan, Duan *et al.* (2008) measured the online WOM with “Yahoo! Movies” in the same way that we do. In the case of critical reviews, the NAVER Movie section contains expert ratings with short comments in the ratings section, which are provided by two major movie magazines in Korea: Cine21 and Film2.0[5]. Each movie has its own volume of expert ratings, and the attitude of ratings with the number between one and ten, and a “good or bad” rating system.

#### *Movie categorization*

In order to see the different effects of WOM on box office revenues for different movie categories, effective categorization of movies is important. As our focus is to see the heterogeneous effect of WOM on mass and niche products, the categorization of movies also has to be done in the same manner. In the case of the motion picture industry, product type can be operationalized as mass or niche movies. Mass movies refer to those movies relatively more commercial and targeting large market segment with greater marketing budget. On the other hand, niche movies are less commercial but more artistic targeting relatively smaller market segment with smaller marketing budget[6]. In determining the degree to which a movie is commercial or artistic, previous studies have used various criteria such as the share of screens (Reinstein and Snyder, 2005), movie star effect (Bagella and Becchetti, 1999), content, genre, narrative structure (Thompson, 2001), and the market role of distributors (Gemser *et al.*, 2007; Zuckerman and Kim, 2003). In our study, we adopt the market role of distributors for categorization. Movie distributors tend to avoid movies that do not seem likely to succeed in the market based on past experience and data, as well as movies in which no highly reputed stars are involved. This skews the distribution of movies; distributors tend to establish their identities by choosing either mass movies or niche movies (Zuckerman and Kim, 2003).

In the case of the Korean movie market, there are ten major distributors, including the top three distributors, CJ Entertainment, ShowBox, and UIP Korea. According to the 2007 KOFIC annual report, the top ten distributors accounted for 93.7 per cent of the market share in Seoul (Korean Film Council, 2007). Therefore, if a movie is distributed by one of the top ten distributors, the movie is assumed to be a mass movie. Table II shows the comparison of mass and niche movies. As expected, niche movies have fewer moviegoers, lower box office revenue, and lower volume of WOM than mass ones. However, the number of critical reviews is not very different between mass movies and niche.

#### *Other attributes*

We consider five genres, action or adventure (GACADV), comedy (GCMD), science fiction (GSCIFI), romance (GRMC), and drama (GDRM), based on the classification by the Korean Movie Database (KMDb)[7]. Movies are coded using the prohibition code for movies based on the movie rating system by the Korea Media Rating Board, akin to the MPAA rating in the USA. Movies are classified as suitable for all ages or prohibited for viewers under 12, 15, or 18 (RATE12, RATE15, RATE18). In addition, in order to measure the competition effect, we consider the weekly average age of the top

Variable	Mass	Niche	Effect of WOM on product sales	
Number of movies	51	66		<b>1529</b>
Major genres	Drama (15), Comedy (10) Action/adventure (11)	Drama (43), Comedy (12)		
Avg. box office revenue (aggregate)	\$4,185,501	\$40,974		
Ave. number of screens	154	13		
Avg. number of critics	6	5		
Avg. number of WOM (weekly)	240	35		
Avg. valence of WOM (weekly)	7.96	8.17		
<b>Notes:</b> Total number of movies = 117. All currency used in this study is USD (1USD = 1300KRW helps to understand the amount)			<b>Table II.</b> Comparison of mass and niche movies	

20 movies in terms of box office revenue and the number of new releases among the top 20 movies, similar to Liu (2006). Table III shows the list and description of variables used in this study.

## Results and discussion

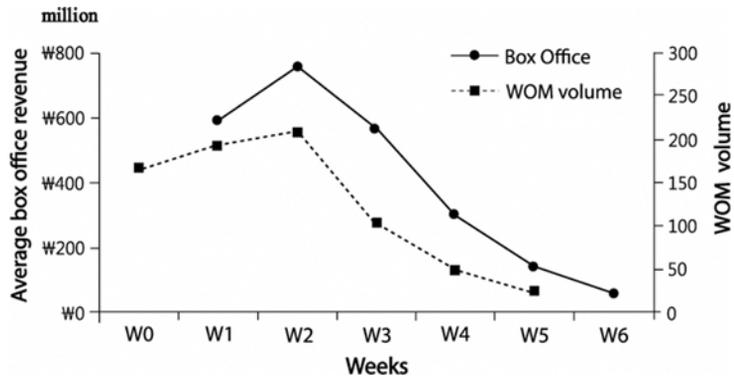
### *Weekly patterns of box office revenue and WOM*

Figures 1 and 2 illustrate the dynamic patterns of average box office revenue and WOM for mass and niche movies, beginning with  $W_0$ , which represents the prerelease period. The patterns of weekly box office revenue and those of volume for previous week's WOM fit reasonably well for both mass and niche movies. According to previous literature, the pattern of WOM volume reaches its highest point during the first or second week after the movie is released (Liu, 2006; Moul, 2007), and our dataset matches these previous studies. In addition, we find that the WOM volume of mass movies is greater than that of niche ones as we expected from arguments made

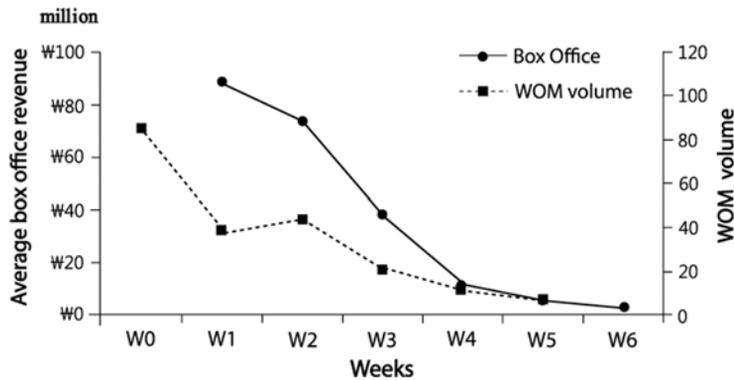
Variables	Description
TOTALREV	Total box office revenue
LNREV <sub>t</sub>	Box office revenue in week t (in log scale)
LNMSG <sub>t</sub>	Number of WOM messages in week t (in log scale)
VALENCE <sub>t</sub>	Valence of WOM in week t
LNCRITIC	Number of professional critical reviews (in log scale)
CRCON	Percentage of negative critical reviews
CRPRO	Percentage of positive critical reviews
AGE <sub>t</sub>	Average age of the top 20 movies in week t
NEW <sub>t</sub>	Number of new releases among the top 20 movies in week t
RATE12	Movie is rated for more than 12 (dummy)
RATE15	Movie is rated for more than 15 (dummy)
RATE18	Movie is rated for more than 18 (dummy)
GDRM	Movie genre is drama (dummy)
GCMD	Movie genre is comedy (dummy)
GRMC	Movie genre is romance (dummy)
GACADV	Movie genre is action or adventure (dummy)
GSCIFI	Movie genre is science fiction (dummy)

**Table III.**  
List of variables

**Figure 1.**  
Patterns of box office and  
WOM for mainstream  
movies



**Figure 2.**  
Patterns of box office and  
WOM for non-mainstream  
movies



previously. On the other hand, the pattern of niche movies seems to be different. WOM volume reaches its highest point in the prerelease period and drops continuously except for a small rise during  $W_2$ .

*WOM and weekly box office revenue*

We estimate the effect of WOM using panel data analysis. The estimated panel model for weekly box office revenue is as follows:

$$\begin{aligned}
 \text{LNREV}_{it} = & \text{CONST}_t + a_0\text{SCR}_{it} + a_1\text{LNMSG}_{it} + a_2\text{VALENCE}_{it} + A_3\Gamma + A_4\Pi \\
 & + A_5R + A_6G + \varepsilon_{it},
 \end{aligned}
 \tag{1}$$

where  $t$  for each week is ( $t = 1, 2, \dots, 6$ ) and  $i$  for each movie is ( $i = 1, 2, \dots, 117$ ). The model consists of the number of screens (SCR)[8], WOM attributes (LNMSG, VALENCE), the attributes of critical review ( $\Gamma$ : LNCRITIC, CRPRO, CRCON), competition attributes ( $\Pi$ : LNNEW, LNAGE), prohibition code dummy (R: RATE12, RATE15, RATE18), and genre dummy (G: GACADV, GCMD, GSCIFI, GRMC, GDRM). This model is similar to that of Liu (2006), which extended earlier models proposed by Eliashberg and Shugan (1997) and Basuroy *et al.* (2003), except that we use panel data

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analysis rather than OLS estimation, and add the percentage of negative critical reviews.

Table IV shows the results for pooled data and both fixed effect and random effect model. All models are statistically significant with fairly high adjusted *R*-square values. The estimation result for all movies (without categorizing movies into mass or niche) is shown in column (1). The volume of the previous week's WOM ( $LNMSG_{t-1}$ ) has a significant and positive effect on weekly box office revenue, which is consistent with previous literature. The valence of WOM, however, does not show a significant effect on box office revenue for the random effect model. Therefore, our result is consistent with Liu's (2006). In addition, this result seems to support the study of Sutton (1998), which posited that consumer attitudes do not always relate to their actions in behavioral studies.

We further estimate the model by segmenting the data into mass and niche movies. Column (2) and (3) of Table IV show the estimated results. The WOM volume has significant and positive effects on box office revenue in both mass and niche movies except for the fixed effect model for niche movies. However, the effect of WOM volume is greater in the case of mass movies than that of niche movies, confirming that larger the WOM volume is the greater in its effect on box office revenue (*H1*). In other words, we confirm that consumers build higher credibility on movies with larger WOM volume. In the case of WOM valence, the results are significant only for niche movies. Thus, *H2*, the effect of WOM valence on product sales is positive and greater on niche product than mass product, is supported[9].

### Conclusion

Word of mouth (WOM), which has two important attributes, volume and valence, has been studied as an important factor that influences product sales. In the case of WOM volume, it has been reported as a significant factor which influences product sales. However, the effect of WOM valence on product sales has been controversial and there has been no consensus of opinion in the literature. Some studies report that WOM valence is a significant factor impacting product sales while other studies disagree, especially with regards to the motion picture industry.

In our study, we find that WOM volume and valence have different effects on product sales, corresponding to differences in product category. More specifically, we categorized movies into two groups – mass and niche – based on their distributors and then analyzed the effect of WOM volume and valence on box office revenue. We find that the effect of WOM volume is greater for mass movies which have a larger volume of WOM, supporting our hypothesis that consumers build higher credibility on products with higher sales, especially for experience goods with uncertain quality – although the effect is positive and significant for both product categories. In the case of WOM valence, we find the significant effect for it only in the case of niche movies. In addition, we find that WOM valence does not show significant effect for movies with greater box office revenue within the category of niche movies when we divide the niche movies into two groups based on box office revenue. These results support our hypothesis that greater marketing efforts can decrease the effect of WOM valence on box office revenue. Consequently, our findings suggest a reason for the weak relationship between WOM valence and product sales, which has been controversial in the WOM literature.

**Table IV.**  
The panel analysis result  
on weekly box office  
revenue

	(1) Overall FE <sup>a</sup>		(2) Mass FE		(3) Niche FE		RE
	Pooled	RE <sup>b</sup>	Pooled	RE	Pooled	RE	
SCRt	0.009 <0.0001**	0.011 <0.0001**	0.008 <0.0001**	0.009 <0.0001**	0.016 <0.0001**	0.017 <0.0001**	0.018 <0.0001**
LNMSG-1	0.631 <0.0001**	0.450 <0.0001**	0.661 <0.0001**	0.538 <0.0001**	0.539 <0.0001**	-0.164 0.071*	0.340 <0.0001**
VALENCE-1	0.069 0.338	0.613 0.004**	-0.102 0.454	0.516 0.427	0.239 0.003**	0.718 <0.0001**	0.326 0.005**
NEWt	-0.026 0.472	-0.020 0.424	-0.066 0.282	-0.045 0.217	-0.002 0.949	-0.028 0.258	-0.028 0.287
AGEt	0.039 0.056*	0.016 0.437	-0.014 0.729	-0.003 0.930	0.066 0.002**	0.004 0.856	0.081 0.133
LNCRITIC	0.064 0.602	0.211 0.292	-0.416 0.090*		0.275 0.028**		0.321 0.103
CRPRO	-0.002 0.435	-0.003 0.435	-0.007 0.179		0.002 0.518		0.000 0.956
CRCON	-0.006 0.129	-0.004 0.548	-0.011 0.095*		-0.011 0.012**		-0.011 0.104
RATE12	-0.335 0.132	-0.402 0.275	-0.307 0.442		0.857 0.004**		0.727 0.119
RATE15	0.135 0.537	0.191 0.589	-0.206 0.548		1.420 <0.0001**		1.349 0.004**
RATE18	-0.220 0.359	-0.348 0.376	-0.407 0.319		1.267 <0.0001**		1.152 0.018**
GACADV	0.164 0.573	0.067 0.888	0.501 0.231		1.889 0.033**		0.757 0.468
GCMD	0.123 0.621	0.046 0.911	0.387 0.354		0.254 0.409		0.237 0.621
GSCFI	0.037 0.956	0.110 0.923	-0.397 0.620		0.652 0.126		0.612 0.349
GRMC	0.431 0.170	0.314 0.546	0.583 0.223		0.065 0.815		0.069 0.873
GDRM	-0.011 0.960	-0.081 0.822	0.416 0.260		34.54 <0.0001		223.27 <0.0001
Model fit F/	98.09 <0.0001	614.42 <0.0001	32.65 <0.0001	37.74 <0.0001	229.55 <0.0001	11.99 <0.0001	
Wald chi (p value)	0.716	0.716	0.640	0.730	0.655	0.212	0.602
Overall R <sup>2</sup>							

**Notes:** <sup>a</sup>Fixed effect, <sup>b</sup>Random effect. \* $p < 0.10$ , \*\* $p < 0.05$

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The result suggests that greater marketing efforts can reduce the effect of WOM valence on box office revenue. It could be argued that the information about movies can differ according to the movie type, be it mass or niche. However, internet movie portals generally provide identical quality and format for movie information regardless of movie type. Therefore, when movie-goers discuss movies online and post their personal views, which become WOM, they are less likely to be aware or consider whether the movies are mass or niche product. This likely provides movie-goers the same opportunity to be involved in WOM activity regardless of movie type.

Although the opportunity to engage in WOM activities is the same between mass and niche movies, the large scale multi-channel marketing campaigns by the dominant distributors can affect the choices of a large portion of movie-goers, including those who incorporate the WOM valence of the web portals in their decision-making. Therefore, as the number of consumers who are affected by the large distributors' marketing activity through various marketing channels increases, the effect of WOM valence of web portals on the box office revenue will be diluted and decrease. Conversely, in the case of niche movies, we expect that the WOM valence will have a significant effect on the box office revenue since the marketing efforts of niche movie makers are relatively small compared to mass movies. Consequently, the effect of WOM valence will be more significant in the case on niche movies. The results of column (2) and (3) of Table IV support our hypothesis.

Our finding contributes to the WOM literature in that it explains the reason for the mixed effect of WOM valence on product sales by considering the effect of other marketing communication sources on consumer purchase decisions. Since consumer purchase decisions depend on overall judgment based on information from various sources regarding products, a consumer may search for information from additional information sources when the information that the consumer primarily considers, e.g. online WOM, gives insufficient or low quality information. Consequently, as marketing budgets for a product become larger, movie-goers are more likely to come across the information about the product and will be persuaded by its advertisements, which dilutes the effect of online WOM on product sales. We confirm our hypothesis by examining the movie market data segmented into mass and niche movies.

In addition, we also suggest that the larger the WOM volume, the higher the credibility that consumers will build on the product. The credibility of WOM can be dependent on the popularity or previous product sales. Moreover, consumers build higher credibility on products with higher sales, especially for experience goods with unknown quality when they understand other consumer views concerning a particular product, which reduces uncertainty associated with the product. In our findings, we confirm that the effect of WOM volume is greater in the case of mass movies than that of niche movies, in other words, the larger the WOM volume the greater its effect on box office revenue. These two findings enable us to better understand the mechanism of WOM effect on product sales and add more insight to the WOM literature.

#### *Managerial implications*

The previous findings lead to several managerial implications:

- First, our findings show that WOM can have different effects on product sales for mass versus niche products. Therefore, it suggests that we need more systematic approaches to WOM management. In our study of the motion picture industry,

our finding that WOM valence do not have significant effects on product sales in mass products suggests that those who are dealing with mass marketing activities for a product, such as mass movies, need to concentrate more on various marketing effort through diverse market communication channels rather than focusing on the attitude of consumers. On the other hand, for those who have limited marketing budgets, such as those who distribute less commercial and more artistic movies and, consequently, have a smaller market share compared to major distributors, the valence of WOM can be an important strategic tool for the success of the product in the market. Generally, niche products have fewer marketing resources and, therefore, fewer marketing communication channels, which imply that small efforts through WOM valence will be able to leverage their outcomes.

- Second, our findings show that WOM can have different effects on product sales corresponding to differences in product characteristics. Therefore, managers and marketers need to look into the WOM effect more closely in relation with product characteristics and find appropriate WOM strategies that are specific and most effective for the product in question. Additionally, different product types, such as search, experience, and credence goods may have different WOM effects corresponding to their inherent product characteristics. As online reviews, community-based discussions, and other forms of WOM are getting more popular and common for a variety of products, more information will be available for managers and marketers to identify different WOM effects corresponding to product characteristics. Therefore, managers will be able to increase ROI on marketing strategies by finding the most relevant and effective WOM strategy specific to their products.
- Third, results show that there is a significant and positive relationship between the volume of the previous week's WOM and weekly product sales. Therefore, the previous weeks' WOM volume can be used as a predictor of weekly product sales for both mass and niche products. In other words, WOM volume can be an important strategic tool for the success of a product when we have increasing returns to marketing for WOM volume – greater marketing efforts increase the effect of WOM volume on product sales. Therefore, it will be important for producers and distributors to develop an appropriate and strategic management of WOM volume for the success of their products. Buzz marketing or viral marketing are good examples. Especially, in the case of movie industry, WOM can be used as a useful scale for next week's plan, since movie theaters rearrange their movie programs weekly (Eliashberg *et al.*, 2009).

#### *Limitations and further research*

This study has several limitations and room for future research. First, using box office revenue as a dependent variable is more meaningful to distributors than producers. Aftermarket revenue for movies from sales such as DVDs has become important revenue sources for movie producers. Therefore, it will also be important to find the relationships between WOM and aftermarket revenue. Second, different pattern of WOM in niche movies seems to stem from the different movie features or customer behavior for this category, which would be an interesting topic for further study. Specifically, a further categorization of movies will be able to give us further insights

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into the relationship between WOM and box office revenue. For example, it will be important to explore the varying influences of WOM on box office revenue corresponding to the different movie genres. Third, an interesting finding of this study is that positive critical reviews have negative relationships to the sales of mass movies[10]. This means that critical reviews are not persuasive to consumers in mass movies. Therefore, it will be also interesting to explore the different persuasive effects of critical reviews corresponding to consumer heterogeneity, which will give us new insights for target marketing in the motion picture industry and other cultural industries.

### Notes

1. Ba and Pavlou (2002) found that online feedback mechanisms can induce trust, which, in turn, can mitigate information asymmetry and as a result generate a price premium for goods sellers.
2. We collected data on 362 movies, which is the total number of movies released in South Korea in 2006, from the Korean Film Council (KOFIC). After filtering these movies for those with missing observations or less than a six-week life cycle, 117 movies remained that can be said reasonably to represent the market in 2006. The number of filtered data are 174 movies for missing observations and 71 movies for fewer than six weeks' life cycle. Among the remaining 117 movies, foreign movies, including Hollywood movies, account for 74 per cent.
3. It is reported that the market share of the web portal "Naver" is 61.5 per cent. KFTC (2009), "Internet Portal Industry Competition Policy Report, Korea Fair Trade Commission", Seoul.
4. It is likely that all three sections could be involved with WOM. However, we should note that there are some limitations in using movie reviews. First, the section does not contain pre-release reviews of movies and, therefore, it is not appropriate for prerelease analysis. Second, the Netizen Reviews section provides a starring score but it is not counted for the representative rating of movies. However, the average rating score of the ratings section is provided as representative user rating information. Finally, the number of messages in the Netizen Review section is fewer than those of the ratings section for most movies.
5. Critical reviews in the USA are usually provided by daily newspapers. In South Korea, weekly magazines for movies provide critical reviews and daily newspapers do not provide them.
6. The terms of mass and niche product in movie industry is also called as mainstream and non-mainstream movies.
7. Available at: [www.kmdb.or.kr/eng/index.asp](http://www.kmdb.or.kr/eng/index.asp)
8. Number of screens has been selected as an independent variable in the previous studies of box office revenue (Duan *et al.*, 2008; Gemser *et al.*, 2007; Liu, 2006). However, according to Elberse and Eliashberg (2003), factors such as movie features, WOM, critical reviews influence not only on the box office revenue but also on the number of screens. In addition, the number of screens is usually adjusted by theater owners depending on the performance of movie in the previous week. Therefore, we formulate simultaneous equation model (two SLS) using an instrumental variable and test the endogeneity of the number of screens. Several tests such as Durbin test, Wu and Hausman test show that there is no endogeneity problem in the model supporting the use of the panel and OLS estimation. One explanation for the absence of endogeneity is that the control of screens by theater owners is not caused by strategically observing the performance and competition of movies.
9. We also estimated WOM effects, each week separately, for first six weeks similar to previous research (Liu, 2006). The results are consistent with the panel data estimation in Table IV,

confirming that the effect of WOM volume is greater for mass movies and that of WOM valence is significant and greater for niche movies. More specifically, all models are statistically significant except for that of W1 in the case mass movies. The coefficients of WOM volume for mass movies are significant and greater than those of niche movies. For WOM valence, only niche movies show significant effect on box office revenue in four weeks out of six.

10. See the signs of CRPRO are reversed on mass and niche movies in Table IV.

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