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# The Effect of Social Media as a Marketing Channel on Advertising Costs*

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〈Abstract〉

The aim of this paper is to examine the relationship between social media activities (e.g., adopting social media as a marketing channel : posting, editing page information, commenting, liking, and sharing) and corporate operating costs, particularly advertising costs, using actual market data. And we study the effect of the debt ratio on the relation between adopting social media and advertising cost. In total, 565 firms listed in KOSPI are included in the empirical study. Multiple regression method is conducted. The results suggest that company－driven social media activity (posting, updating text) is related to higher advertising expenses, while customer－driven social media activity (liking, commenting) is not. Also, the positive association between adopting social media and advertising cost is weakened, as the debt ratio of the corporation is higher. To the best of our knowledge, this empirical study is the first to empirically reveal the numerical relationship between social media activities and advertising costs using actual market data.

〈Key words〉 Social Media, Facebook, Debt Ratio, Advertising Costs, Marketing Channel

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# Ⅰ. Introduction

For advertisement purposes, many companies have begun using information technology－enabled channels such as social media in addition to traditional channels (e.g., TV, radio, and newspapers). With the advent of Web 2.0 technology, social media such as Facebook have become an extensive playground for companies to deliver information about their products and services for loyal or potential customers from all over the world. Many marketing experts now believe that social media influences purchase decision－making (Unhelkar et al., 2014 ; Lee et al., 2017), because when the users respond positively to online ads, the ads can be highly effective in triggering a purchase (Wei et al., 2010). Hence, how well a company uses social media in advertising may determine the effectiveness and efficiency of its marketing activities (Cohen, 2009).

Social media as a marketing tool provides an easy－to－use platform that can be accessed from almost anywhere in the world to satisfy people's social needs. Social media may also be a better way of keeping in touch with a large number of people than by sending bulky SMS or e－mail messages. Due to its accessibility and extendibility, advertising activity using social media has been regarded as an efficient marketing channel.

Prior research has demonstrated that social media increases the efficiency of advertisements. Social media is also more cost effective than traditional advertisement (Rajalakshmi and Umarani, 2014) due to its diverse capabilities such as connectivity, sharability, online word of mouth, and users' comments and opinions (Webster, 2010). Furthermore, companies can develop individual or viral marketing strategies for social media users by understanding their preferences and traits in a programmatic and very cost－effective manner (Daniasa et al., 2010 ; Hensel and Deis, 2010). Some studies, on the other hand, posit that using social media for advertisement is not cost effective. For example, since some consumers perceive advertising in virtual communities negatively, social media can be a forum for negative word of mouth, which results in additional costs that must be recovered (Lukka and James, 2014). This disparity in academic opinion indicates that the relationship between social media usage for marketing purposes and advertisement efficiency requires further examination. Accordingly, we provide this empirical study of social media as a substitute for or supplement to traditional advertisement channels.

In this paper, we empirically investigate the effects of adopting social media as a marketing activity on corporate advertising costs. Furthermore, we also test the effect of the debt ratio on the association between social media usage and advertising costs. In order to ensure the results,

control variables that may affect the cost of advertising are included and tested. The sample includes corporations listed in the Korea Composite Stock Price Index (KOSPI) in the year 2014. For each corporation, social media usage data are collected by a data crawler using social media API (e.g., twitter API, Facebook API, etc.) and the Java application. In addition, financial data of companies are acquired from KIS－VALUE and TS－2000.

The results of our study suggest that company－driven social media activity is related to higher advertising expenses, while customer－driven activity is not. Most company－driven social media activity variables (the number of words that a company posts on its Facebook page, the number of words used to edit the information on the Facebook page, using one or more social media accounts other than Facebook, the number of media types used on the company's Facebook page, and the number of words used on the company's Facebook page to explain the company's current performance) show significantly positive (＋) with advertisement costs. And the positive (＋) association between using a company has its own Facebook account and advertisement costs is weakened, as the debt ratio of the corporation is higher.

This paper is organized as follows : section 2 provides a literature review related to social media, advertising expenses, and debt ratios. It also describes the association between social media activity, corporate advertising expenses, and debt ratios. The hypotheses are also presented. The research model and empirical results are provided in sections 3 and 4, respectively. Finally, in section 5, we conclude by presenting the results of testing of the hypotheses and give suggestions based on the results to researchers and practitioners.

## Ⅱ. Theoretical Background and Hypotheses

In this study, we propose that several social media activities influence the cost of advertising in organizations. As shown in Figure 1, these social media activities consist of company－driven social media activities (e.g., posting, editing page information, operating different social media, variety of information, publishing data about the company's current performance, sharing the company's vision online), and customer－driven social media activities (liking posts, commenting on posts, sharing posts, and liking pages). Park et al. (2016) classify social media activities with two categories : company－driven social media activities and customer－driven social media activities.

〈Figure 1〉 Research model

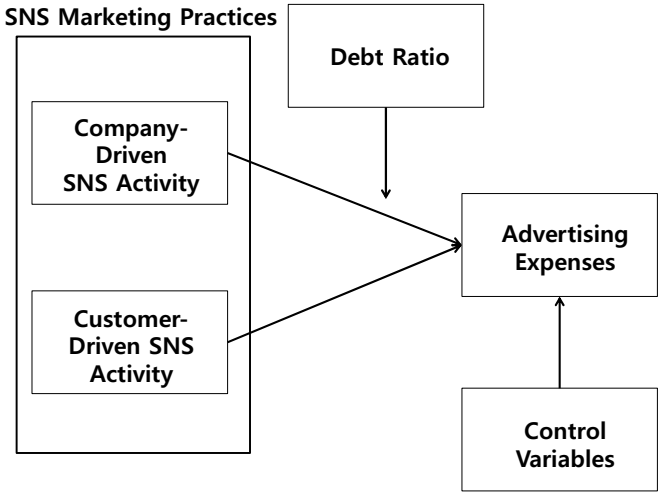


Table 1 provides a list of the social media activities as determinants of advertising costs that are considered in this paper. The variables representing social media activities that are considered as determinants of advertising costs are summarized in Table 1.

〈Table 1〉 Variables related to social media activity considered in this study

| Category | Variable | Description |
|---|---|---|
| Company-Driven Social Media Activity | *Postcount* | The number of words posted on Facebook within a given period |
| | *Pageinfowords* | The number of words used to edit the information on the Facebook page |
| | *SN* | Dummy variable with a value of 1 if a company has one or more social media accounts other than Facebook |
| | *Variety* | The number of media types used on the company's Facebook page |
| | *Current performance* | The number of words used on the company's Facebook page to explain the company's current performance |
| | *Future vision* | The number of words used on the company's Facebook page to explain the company's vision or plans |
| Customer-Driven Social Media Activity | *Postlikes* | The number of "likes" related to postings on the company's Facebook |
| | *Postcomment* | The number of words posted in reply on the company's Facebook page |
| | *Postshares* | The number of "shares" posted on the company's Facebook page |
| | *Pagelikes* | The number of "likes" related to pages on the company's Facebook |

## 1. Social Media-Based Marketing Practices and Advertising Expenses

Recently, the role of social media as an important marketing tool and new advertisement channel has increased (Tellis et al., 2005). Social media is a platform that connects all users in the world into a single community. Through the use of social media, consumers obtain information that informs their decision making. They can exchange opinions and influence other people's purchase decisions (Unhelkar et al., 2014). Because users naturally tend to rely on each other and may exchange vast amounts of information, the effect of advertisement via social media is quite significant (Webster, 2010). Additionally, using data on users' gender, location, and usage time obtained through Log Analytics, companies can customize marketing for every consumer, increasing the effectiveness of advertisement (Daniasa et al., 2010). Also, databases of customer information can facilitate target marketing using advertising customized for each consumer (Hensel and Deis, 2010). In the long-term, social media advertisements can improve corporate images and gain potential customers. Because social media allows for two-way communication between corporations and customers, combining social media with other marketing media may result in a viral marketing effect (Daniasa et al., 2010).

The cost of advertising via social media is relatively lower than that using traditional advertisement media (Rajalakshmi and Umarani, 2014). However, even small costs add to the total amount of advertisement expenditure for a company. The process of advertising through social media is as follows. To initialize social media profile, a company must establish a team or task force, which may require additional labor and space. Computer systems must be rented or purchased, social media page must be designed, and an introduction or summary of corporate activities must be written. Social media page design and implementation for corporations is different from that for individuals who simply post words or pictures on their accounts at no cost. Companies may also hire advertisement agencies to manage social media advertising on their behalf. Thus, an agency may post upcoming events on the company's social media page or promote the company in other ways. All this activity increases expenditure for the purposes of advertisement. Once the social media-based advertisement has been established, other expenses may be incurred by a department within the firm dedicated to the maintenance and management of social media activity.

Social media-based marketing practices consist of company-driven and customer-driven activities (Park et al., 2016). Company-driven activities include the preparation and uploading of content that is directly or indirectly related to advertisement. The company posts content and/or publishes information about the company profile and its products. As posting frequency or volume

increases in terms of the number of words or images, we can assume that the company is actively advertising via social media. In addition, we can also assume that the more often companies advertise using social media, the higher the cost of advertising will be. Therefore, we hypothesize :

Hypothesis 1-1 : *All else being equal, the frequency and volume of posts on a firm's social media page are positively associated with the advertising expenses of the firm.*

Hypothesis 1-2 : *All else being equal, the frequency and volume of updated text on a firm's social media page are positively associated with the advertising expenses of the firm.*

In addition to company-driven activity, customer-driven activity, such as liking and commenting, is important to the marketing strategies of firms (Malhotra et al., 2013). In many cases, "likes" on social media are becoming regarded as free "ads" that may be important for businesses (Baresch et al., 2011). Counting likes as ads is different from determining the frequency or volume of posts and updating the text of a firm's social media page in that the user's liking activity is fully voluntary, and therefore involves no additional cost to the company. Therefore, the number of "likes" will not affect the firm's advertising expenses. Hence, we hypothesize :

Hypothesis 1-3 : *All else being equal, the number of "likes" for the posts on a firm's social media page is NOT associated with the advertising expenses of the firm.*

Second, similar to the situation with "likes", comments on a company's social media page are provided by customers on a volunteer basis. Using their comments, social media users can communicate with the company and other consumers. The comments can be used to the social media marketing practitioner's advantage to gain feedback and understand consumers better in a very cost-effective manner (Malhotra et al., 2013). Hence, we hypothesize :

Hypothesis 1-4 : *All else being equal, the number of comments in response to the posts on a firm's social media page is NOT associated with the advertising expenses of the firm.*

Next, we investigate the different effects on advertising expenses of company-driven content and customer-driven content. If a firm operates various social media like Facebook, it incurs

additional advertising expenses. The more information a firm supplies on social media, the higher its advertising expenses will be. Hence, we hypothesize :

Hypothesis 1-5 : *All else being equal, the frequency and volume of posts of company-driven content are positively associated with the advertising expenses of the firm.*

By contrast, customer-driven content may not affect advertising expenses significantly. As customer-driven content, such as the number of shares and page likes, are out of the firm's control, they are unrelated to changes in advertising expenses. Therefore, we hypothesize :

Hypothesis 1-6 : *All else being equal, the frequency and volume of posts of customer-driven content are NOT associated with the advertising expenses of the firm.*

Companies with their own social media may choose to provide users with information about their current performance. However, this can be a daunting task because of the relatively large volume and specificity of such information. Due to the time required to provide this information, advertising expenses may increase. However, posting about the company's vision for the future provides users with abstract information of relatively little volume that requires less time to provide. In this case, advertising expenses may not increase. Therefore, we hypothesize :

Hypothesis 1-7 : *All else being equal, the number of posts on current performance is positively associated with the advertising expenses of the firm, and the number of posts on the company's future vision is NOT associated with the advertising expenses of the firm.*

## 2. Debt Ratio and Advertising Expenses

As the amount of advertising activity increases, advertising expenses can become more and more burdensome to the company (Reich and Brettel, 2012). In particular, advertising expenses will be more burdensome for companies with high financial risk. According to Jensen (1986), in companies that rely on debt, managers will struggle during times of recession or bankruptcy, because they cannot utilize financial resources properly.

Debt ratio is often used in academic research as a proxy for corporate financial risk (Watts and Zimmerman, 1990 ; DeFond and Jiambalvo, 1994). The debt ratio is the ratio of total debt divided by total assets on the balance sheet. If the debt ratio is high, the company has a relatively high

amount of debt. This means that both the default risk and the bankruptcy risk of the company are high. Having a high debt ratio can worsen the financial environment of companies. The higher the debt ratio of a company, the higher its default and bankruptcy risk.

Therefore, as the debt ratio increases, pressure to maximize profit and decrease costs will also increase (DeFond and Jiambalvo, 1994). When a company carries a high debt ratio, earnings management becomes a great temptation as a way to increase the firm's profit (Sweeney, 1994). Because of their precarious financial position, we expect that companies with high debt ratios may be unwilling to pay for advertisement. Hence, we hypothesize that :

Hypothesis 2 : *The positive association between engaging in social media activity and advertising expenses is weaker for firms with higher debt ratios.*

## 3. Control Variables

As advertising expenses are part of the sales – management – expense triangle, they are highly associated with the company's net income. Since net income is calculated based on the company's sales and expenses, advertising expenses may be related with net income. Net income is a measure of firm performance (Dhaliwal et al., 1999). According to McConnell and Servaes (1990), advertising expenses have a positive relation with firm performance. Hence, we employ these control variables in the model in our study, with reference to prior research related to firm performance.

Ross (1977) reports firm performance of companies with higher debt ratios is better than that of companies with lower debt ratios due to careful monitoring by the capital market. Issues related to financial structure such as the debt ratio can influence the expenses of a firm. In particular, a high debt ratio can lead to decreased advertising expenses, as advertising is not essential for the survival of the company. Therefore, we expect the sign of *Lev* to be negative (−). Francis et al. (2004) explain that the larger the firm, the better the firm performance. Larger companies may have sufficient funds to spend on advertisement. Therefore, in our analysis, the sign of *Size* is anticipated to be positive (+). Carter et al. (2003) assert that *ROA* has a positive (+) relation with firm performance. McConnell and Servaes (1990) report that advertising expenses have a positive (+) relation with firm performance. However, expenses decrease *ROA* in general. Therefore, it is hard to anticipate what sign the *ROA* will have.

Ownership structure may also have an effect on firm performance. Stulz (1988) explains that as the ratio of managers' shareholding increases, managerial control and power also increases.

However, if the ratio of managers' shareholding exceeds a certain level, it results in the decrease of firm performance. This lack of consistent results in earlier research makes it difficult to anticipate whether the sign of *Major* will be positive (+) or negative (−). Smith et al. (1997) report that the foreign shareholding ratio also has a positive effect on firm performance. As external monitors, foreign shareholders have incentive to pay close attention to corporate expenses for better firm performance. Hence, we expect the sign of *Foreign* to be negative (−).

We also assume that if a firm reports a loss, the manager of the company will refrain from spending more. Therefore, we employ *Loss* (a dummy variable representing whether or not a firm reports a loss on the financial statement) as a control variable. We expect the sign of *Loss* to be negative (−). Eisenberg et al. (1998) report that the relationship between the age of a firm and firm performance is negative (−). Though it is hard to anticipate the sign of *AGE*, this variable may have an effect on advertising expenses. Hence, *AGE* is included in the model as a control variable. Folse et al. (2010) present that corporate donations have a positive (+) effect on sales. Because corporate donation may affect consumers' purchasing behavior, donation can be considered a type of advertisement for a firm. Therefore, we expect the sign of *Donate* to be positive (+).

# Ⅲ. Research Design

## 1. Sample Selection

The sample used in this study is limited to firm−years satisfying the following criteria :

(1) KOSPI (Korea Composite Stock Price Index)−listed companies in 2014 ;

(2) Companies from non−financial industries whose fiscal year−end is in December ;

(3) Companies for which required financial data are available in KIS−VALUE and TS−2000.

The Korea companies listed in the KOSPI actively utilize social media for the purposes of advertisement and customer service. Our analysis sample includes 773 firms that were KOSPI−listed companies in 2014. So as to control for differences in year−end, the sample companies are limited to those with a December year−end. To reduce the effect of outliers, we winsorize all the samples included in our model at the top and bottom 1%. Therefore, the final sample for the analysis is comprised of 565 firms.

In order to obtain the social media data, we collect posted articles from the 1st of January to the 31st of December, 2014 on Facebook. We select companies with their own Facebook accounts among the KOSPI－listed companies, excluding deactivated Facebook accounts. Among the 2014 KOSPI－listed companies, 65 firms have their own Facebook accounts. Deactivated Facebook accounts are excluded to avoid distortion of the results of the analysis. To collect the Facebook data for these companies, we use a Java Application program called Facebook API (Application Programming Interface). Financial data in this study obtains from the KIS－VALUE (owned by the NICE Credit Rating System) and the TS－2000 (owned by the Korea Listed Companies Association). Table 2 outlines the descriptive statistics for our sample. On average, the companies expend 0.7% of their sales volume on advertising expenses (*ADVE*). In addition, 14.5% and 11.0% of the firms in our sample actively use Facebook and other social media, respectively.

〈Table 2〉 Descriptive statistics (n=565)

| *Variable* | | *Mean* | *Std Dev* | *Minimum* | *Lower Quartile* | *Median* | *Upper Quartile* | *Maximum* |
|---|---|---|---|---|---|---|---|---|
| $ADVE_t$ | | 0.007 | 0.016 | 0.000 | 0.000 | 0.001 | 0.006 | 0.086 |
| Facebook Adoption | $SM_t$ | 0.145 | 0.353 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| Company－Driven Social Media Activity | $Postcount_t$ | 22.165 | 62.932 | 0.000 | 0.000 | 0.000 | 0.000 | 240.000 |
| | $Pageinfowords_t$ | 59.329 | 66.934 | 1.000 | 21.000 | 40.000 | 70.000 | 425.000 |
| | $SN_t$ | 0.110 | 0.588 | 0.000 | 0.000 | 0.000 | 0.000 | 7.000 |
| | $Variety_t$ | 0.600 | 1.555 | 0.000 | 0.000 | 0.000 | 0.000 | 7.000 |
| | *Current performance*$_t$ | 21.400 | 25.223 | 0.000 | 3.000 | 13.500 | 29.000 | 113.000 |
| | *Future vision*$_t$ | 2.667 | 5.773 | 0.000 | 0.000 | 1.000 | 3.000 | 36.000 |
| Customer－Driven Social Media Activity | $Postlikes_t$ | 4,174 | 27,707 | 0.000 | 0.000 | 0.000 | 0.000 | 540,316 |
| | $Postcomment_t$ | 11,469 | 35,938 | 0.000 | 120 | 2,981 | 11,430 | 310,804 |
| | $Postshares_t$ | 2,689 | 4,683 | 0.000 | 59 | 1,222 | 3,402 | 32,358 |
| | $Pagelikes_t$ | 11,895 | 75,644 | 0.000 | 0.000 | 0.000 | 0.000 | 1,083,604 |

〈Table 2〉 Descriptive statistics (n=565) (continued)

| Variable | Mean | Std Dev | Minimum | Lower Quartile | Median | Upper Quartile | Maximum |
|---|---|---|---|---|---|---|---|
| $Lev_t$ | 0.448 | 0.193 | 0.051 | 0.289 | 0.448 | 0.584 | 0.911 |
| $Size_t$ | 26.802 | 1.517 | 23.453 | 25.779 | 26.595 | 27.566 | 30.733 |
| $ROA_t$ | 0.011 | 0.083 | −0.474 | −0.003 | 0.023 | 0.049 | 0.192 |
| $Major_t$ | 0.437 | 0.166 | 0.000 | 0.313 | 0.436 | 0.547 | 0.900 |
| $Foreign_t$ | 0.099 | 0.139 | 0.000 | 0.008 | 0.039 | 0.134 | 0.892 |
| $Loss_t$ | 0.255 | 0.436 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| $Age_t$ | 3.416 | 0.738 | 1.099 | 3.296 | 3.664 | 3.871 | 4.205 |
| $Donate_t$ | 0.001 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.010 |

$ADVE_t$=advertising expenses/sales ; $SM_t$=dummy variable with a value of 1 if a company has its own Facebook account, otherwise 0 ; $Postcount_t$=the number of words that a company posts on its Facebook page ; $Pageinfowords_t$=the number of words used to edit the information on the Facebook page ; $Postlikes_t$ =the number of "likes" posted on the company's Facebook page ; $Postcomment_t$=the number of words posted in reply on the company's Facebook page ; $SN_t$=dummy variable with a value of 1 if a company has one or more social media accounts other than Facebook, otherwise 0 ; $Variety_t$=the number of media types used on the company's Facebook page ; $Postshares_t$=the number of "shares" posted on the company's Facebook page ; $Pagelikes_t$=the number of "likes" on the company's Facebook page ; $Currentperformance_t$ =the number of words used on the company's Facebook page to explain the company's current performance ; $Futurevision_t$=the number of words used on the company's Facebook page to explain the company's vision or plans ; $Lev_t$=total liabilities/total assets ; $Size_t$=natural logarithm of total assets ; $ROA_t$=net income/total assets ; $Major_t$=the largest shareholder's ratio ; $Foreign_t$=the foreign shareholding ratio ; $Loss_t$ =dummy variable, 1 if the net income of the company shows loss, otherwise 0 ; $AGE_t$=natural logarithm of (current year − founded year) ; $Donate_t$=donation expenses/sales.

## 2. Research Model for Social Media Usage and Advertising Expenses

In order to test Hypothesis 1, we analyze the relationship between the amount of social media usage and advertising expenses using the model presented in Eq. (1), in which we employ ten measures (*Postcount*, *Pageinfowords*, *Postlikes*, *Postcomment*, *SN*, *Variety*, *Postshares*, *Pagelikes*, *Currentperformance*, and *Futurevision*) for social media activities, as listed in Table 1. In our study, these ten measures represent the amount of Facebook usage of the companies included in the sample.

$$ADVE_t = \alpha_0 + \beta_1 Poscount_t(Pagein fowords_t, Postlikes_t\ Postcomment_t, SN_t, Variety_t, Postshares_t, Pagelikes_t, Currentperformanece_t, Futurevision_t) + \beta_2 LEV_t + \beta_3 Size_t + \beta_4 ROA_t + \beta_5 Major_t + \beta_6 Foreign_t + \beta_7 Loss_t + \beta_8 AGE_t + \beta_9 Donate_t + \beta_{10} industry_t + \epsilon_t \quad Eq.(1)$$

$ADVE_t$ = advertising expenses/sales ;
$Postcount_t$ = the number of words that a company posts on its Facebook page ;
$Pageinfowords_t$ = the number of words used to edit the information on the Facebook page ;
$Postlikes_t$ = the number of "likes" posted on the company's Facebook page ;
$Postcomment_t$ = the number of words posted in reply on the company's Facebook page ;
$SN_t$ = dummy variable with a value of 1 if a company has one or more social media accounts other than Facebook, otherwise 0 ;
$Variety_t$ = the number of media types used on the company's Facebook page ;
$Postshares_t$ = the number of "shares" posted on the company's Facebook page ;
$Pagelikes_t$ = the number of "likes" on the company's Facebook page ;
$Currentperformance_t$ = the number of words used on the company's Facebook page to explain the company's current performance ;
$Futurevision_t$ = the number of words used on the company's Facebook page to explain the company's vision or plans ;
$Lev_t$ = total liabilities/total assets ;
$Size_t$ = natural logarithm of total assets ;
$ROA_t$ = net income/total assets ;
$Major_t$ = the largest shareholder's ratio ;
$Foreign_t$ = the foreign shareholding ratio ;
$Loss_t$ = dummy variable, 1 if the net income of the company shows loss, otherwise 0 ;
$AGE_t$ = natural logarithm of (current year − founded year) ;
$Donate_t$ = donation expenses/sales.

## 3. Research Model for the Effect of the Leverage Ratio on the Relationship between Social Media Activity and Advertising Expenses

In testing of Hypothesis 2, the variable of interest in Eq. (2) is the interaction variable of $SM_t$ and $LEV_{t-1}$, the so−called $SM_t \times LEV_{t-1}$. Before testing Hypothesis 2, we perform an OLS (ordinary least squares) regression analysis the model which the independent variable, *SM* (a dummy variable indicating that the company maintains and operates a Facebook account) and the dependent variable, *ADVE* (advertisement costs divided by sales). The coefficient of interest for the variable *SM* is 0.006, which is statistically significant at the 1% level. This means that for

corporations which possess and operate a Facebook account, one of the most popular forms of social media, advertising expenses are higher than for those companies that do not have one. Therefore, if $\beta_2$ shows the same sign as $\beta_1$, then the firm's leverage ratio strengthens the relation between having a corporate social media account and advertising expenses. By contrast, if $\beta_2$ shows the opposite sign to that of $\beta_1$, then the firm's leverage ratio weakens the association between adopting social media and advertising expenses.

$$ADVE_t = \alpha_0 + \beta_1 SM_t + \beta_2 SM_t \times LEV_t + \beta_3 SM_t + \beta_4 SIZE_t + \beta_5 ROA_t + \beta_6 Major_t + \beta_7 Foreign_t + \beta_8 Loss_t + \beta_9 AGE_t + \beta_{10} Donate_t \quad \textit{Eq.(2)}$$

$ADVE_t$ = advertising expenses/sales ;
$SM_t$ = dummy variable with a value of 1 if a company use its own Facebook, otherwise 0 ;
$Lev_t$ = total liabilities/total assets ;
$Size_t$ = natural logarithm of total assets ;
$ROA_t$ = net income/total assets ;
$Major_t$ = the largest shareholder's ratio ;
$Foreign_t$ = the foreign shareholding ratio ;
$Loss_t$ = dummy variable, 1 if the net income of the company shows loss, otherwise 0 ;
$AGE_t$ = natural logarithm of (current year − founded year) ;
$Donate_t$ = donation expenses/sales.

# Ⅳ. Results

Table 4 − 1 shows the results of the analysis for testing of Hypotheses 1 − 1 and 1 − 2. The coefficient of *Postcount* is 0.00003, which is significant at the 1% level, and the coefficient of *Pageinfowords* is 0.00009, which is significant at the 5% level. Table 4 − 1 also provides the results of the analysis for testing of Hypotheses 1 − 3 and 1 − 4. The coefficients of *Postlikes* and *Postcomment* are both 0.00000, which is not significant. These results may be caused by differences in social media usage measures. The two measures reported in Table 4 − 1 (*Postcount*, *Pageinfowords*) are related to social media usage that a company can promote and control. Hence, these two measures are related to corporate advertising expenses. However, the other two measures in Table 4 − 1 (*Postlikes, Postcomment*) are related to social media usage that is controlled by users rather than the company. Though a company may have its own social media account, it cannot directly control the number of "likes", "shares", or customer − driven comments. Therefore, these two measures may be unrelated to corporate advertising expenses.

Table 4 − 2 presents the results of the analysis for testing of Hypothesis 1 − 5. The coefficient

of *SN* is 0.00232, which is significant at the 10% level, and the coefficient of *Variety* is 0.00164, which is significant at the 1% level. Table 4－2 also provides the results of the analysis for testing of Hypotheses 1－6. The coefficients of *Postshares* and *Pagelikes* are both 0.00000, which is not significant. The two measures reported in Table 4－2 (*SN, Variety*) are related to company－driven content. These factors can be handled by the firm. Therefore, these two measures affect corporate advertising expenses. However, the other two measures in Table 4－2, *Postshares* and *Pagelikes*, are related to customer－driven content. These factors are not under the company's control. Hence, these two measures do not affect corporate advertising expenses.

Table 4－3 shows the results of the analysis for testing of Hypothesis 1－7. The coefficient of *Currentperformance* is 0.00019, which is significant at the 10% level. The coefficient of *Futurevision* is 0.00024, which is not significant.

These results lead to the following conclusions. When companies provide users with information about the firm's current performance through their own social media, they tend to supply relatively specific information. Therefore, in doing so, they may incur additional advertising expenses. However, when firms post information about the company's vision for the future on their social media, they tend to provide relatively simple, abstract information. Hence, this factor has little effect on advertising expenses.

<Table 4-1> The results of testing of Hypotheses 1-1, 1-2, 1-3, and 1-4 (Dependent variable : *ADVE*)

| *Variable* | *β* | *t-value* | *Significance levels.* | *β* | *t-value* | *Significance levels* | *β* | *t-value* | *Significance levels* | *β* | *t-value* | *Significance levels* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Intercept* | 0.02318 | 2.48 | ** | 0.05869 | 0.85 | | 0.01547 | 1.68 | | 0.10559 | 1.35 | |
| $Postcount_t$ | 0.00003 | 3.32 | *** | | | | | | | | | |
| $Pageinfowords_t$ | | | | 0.00009 | 2.64 | ** | | | | | | |
| $Postlikes_t$ | | | | | | | 0.00000 | −0.63 | | | | |
| $Postcomment_t$ | | | | | | | | | | 0.00000 | −0.42 | |
| $Lev_t$ | −0.00378 | −1.88 | * | −0.01114 | −0.66 | | −0.00383 | −1.90 | * | −0.00685 | −0.36 | |
| $Size_t$ | 0.00005 | 0.14 | | −0.00145 | −0.67 | | 0.00039 | 1.19 | | −0.00232 | −0.93 | |
| $ROA_t$ | −0.00829 | −1.94 | * | −0.0884 | −1.39 | | −0.00842 | −1.97 | | −0.06165 | −0.86 | |
| $Major_t$ | 0.00273 | 1.19 | | 0.02174 | 1.20 | | 0.00204 | 0.89 | | 0.0193 | 0.95 | |
| $Foreign_t$ | −0.01331 | 3.59 | *** | −0.06429 | 3.47 | *** | −0.01532 | 4.15 | *** | −0.07026 | 3.36 | *** |
| $Loss_t$ | 0.00012 | 0.11 | | −0.01068 | −1.20 | | 0.00009 | 0.082 | | −0.00733 | −0.73 | |
| $Age_t$ | −0.00069 | −1.24 | | −0.0049 | −1.43 | | −0.00075 | −1.33 | | −0.00755 | −1.92 | * |
| $Donate_t$ | 1.15479 | 4.90 | *** | 0.47583 | 0.42 | | 1.21458 | 5.11 | *** | 0.12972 | 0.09 | |
| *Industry* | *Included* | | | *Included* | | | *Included* | | | *Included* | | |
| *F-value* | 8.60 | | *** | 2.67 | | *** | 2.00 | | ** | 1.97 | | ** |
| *Adj_Rsq* | 0.26 | | | 0.45 | | | 0.34 | | | 0.33 | | |

$ADVE_t$=advertising expenses/sales ; $SM_t$=dummy variable with a value of 1 if a company has its own Facebook account, otherwise 0 ; $Postcount_t$=the number of words that a company posts on its Facebook page ; $Pageinfowords_t$=the number of words used to edit the information on the Facebook page ; $Postlikes_t$=the number of "likes" posted on the company's Facebook page ; $Postcomment_t$=the number of words posted in reply on the company's Facebook page ; $Lev_t$=total liabilities/total assets ; $Size_t$=natural logarithm of total assets ; $ROA_t$=net income/total assets ; $Major_t$=the largest shareholder's ratio ; $Foreign_t$=the foreign shareholding ratio ; $Loss_t$=dummy variable, 1 if the net income of the company shows loss, otherwise 0 ; $AGE_t$=natural logarithm of (current year−founded year) ; $Donate_t$=donation expenses/sales ; *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively.

〈Table 4-2〉 The results of testing of Hypotheses 1-5 and 1-6 (Dependent variable : *ADVE*)

| *Variable* | *β* | *t-value* | *Significance levels* | *β* | *t-value* | *Significance levels* | *β* | *t-value* | *Significance levels* | *β* | *t-value* | *Significance levels* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Intercept* | 0.03993 | 2.16722 | ** | 0.04272 | 2.34868 | ** | 0.09644 | 1.43198 | | 0.03618 | 1.95915 | |
| $SN_t$ | 0.00232 | 1.89913 | * | | | | | | | | | |
| $Variety_t$ | | | | 0.00164 | 4.01135 | *** | | | | | | |
| $Post\ shares_t$ | | | | | | | 0.00000 | 0.23202 | | | | |
| $Page\ likes_t$ | | | | | | | | | | 0.00000 | −0.36893 | |
| $Lev_t$ | −0.00487 | −1.39705 | | −0.00552 | −1.60111 | | 0.00616 | 0.35614 | | −0.00501 | −1.4309 | |
| $Size_t$ | −0.00022 | −0.45154 | | −0.00048 | −0.96996 | | −0.00248 | −1.13743 | | −0.00005 | −0.10952 | |
| $ROA_t$ | −0.01772 | −1.81856 | * | −0.01783 | −1.85144 | * | −0.07422 | −1.17661 | | −0.01767 | −1.80704 | * |
| $Major_t$ | 0.00165 | 0.43961 | | 0.00198 | 0.53645 | | 0.01373 | 0.7551 | | 0.00076 | 0.20239 | |
| $Foreign_t$ | −0.01844 | 3.60057 | *** | −0.01639 | 3.21863 | *** | −0.06398 | 3.44891 | *** | −0.019 | 3.68387 | *** |
| $Loss_t$ | −0.00061 | −0.32922 | | −0.00034 | −0.18549 | | −0.00842 | −0.94002 | | −0.00072 | −0.38719 | |
| $Age_t$ | −0.00093 | −1.16569 | | −0.00102 | −1.30159 | | −0.00354 | −1.00245 | | −0.00105 | −1.32626 | * |
| $Donate_t$ | 1.42216 | 4.18944 | *** | 1.35023 | 4.01921 | *** | 0.66559 | 0.59251 | | 1.44546 | 4.20868 | *** |
| *Industry* | *Included* | | | *Included* | | | *Included* | | | *Included* | | |
| *F-value* | 5.76787 | | *** | 6.12637 | | *** | 2.2052 | | *** | 5.66821 | | *** |
| *Adj_Rsq* | 32.51722 | | | 34.12778 | | | 37.00931 | | | 32.0554 | | |

$ADVE_t$=advertising expenses/sales ; $SN_t$=dummy variable with a value of 1 if a company has one or more social media accounts other than Facebook, otherwise 0 ; $Variety_t$=the number of media types used on the company's Facebook page ; $Postshares_t$=the number of "shares" posted on the company's Facebook page ; $Pagelikes_t$=the number of "likes" on the company's Facebook page ; $Lev_t$=total liabilities/total assets ; $Size_t$=natural logarithm of total assets ; $ROA_t$=net income/total assets ; $Major_t$=the largest shareholder's ratio ; $Foreign_t$=the foreign shareholding ratio ; $Loss_t$=dummy variable, 1 if the net income of the company shows loss, otherwise 0 ; $AGE_t$=natural logarithm of (current year − founded year) ; $Donate_t$=donation expenses/sales ; *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively.

〈Table 4－3〉 The results of testing of Hypothesis 1－7 (Dependent variable : *ADVE*)

| *Variable* | *β* | *t* −*value* | *Significance levels* | *Variable* | *β* | *t* −*value* | *Significance levels* |
|---|---|---|---|---|---|---|---|
| *Intercept* | 0.09797 | 1.52 | | *Intercept* | 0.09354 | 1.40 | |
| *Current performance*$_t$ | 0.00019 | 1.83 | * | *Future Vision*$_t$ | 0.00024 | 0.35 | |
| *Lev*$_t$ | 0.00234 | 0.13 | | *Lev*$_t$ | 0.00476 | 0.27 | |
| *Size*$_t$ | −0.00292 | −1.41 | | *Size*$_t$ | −0.0024 | −1.13 | |
| *ROA*$_t$ | −0.08684 | −1.43 | | *ROA*$_t$ | −0.07934 | −1.24 | |
| *Major*$_t$ | 0.01842 | 1.05 | | *Major*$_t$ | 0.01543 | 0.84 | |
| *Foreign*$_t$ | −0.06329 | 3.55 | *** | *Foreign*$_t$ | −0.0653 | 3.49 | *** |
| *Loss*$_t$ | −0.00995 | −1.17 | | *Loss*$_t$ | −0.00072 | −0.38 | |
| *Age*$_t$ | −0.00202 | −0.57 | | *Age*$_t$ | −0.00345 | −0.97 | |
| *Donate*$_t$ | 0.43811 | 0.40 | | *Donate*$_t$ | 0.66483 | 0.59 | |
| *Industry* | | *Included* | | *Industry* | | *Included* | |
| *F* −*value* | | 2.46 | *** | *F* −*value* | | 2.21 | *** |
| *Adj_Rsq* | | 0.42 | | *Adj_Rsq* | | 0.37 | |

*ADVE*$_t$=advertising expenses/sales ; *Currentperformance*$_t$=the number of words used on the company's Facebook page to explain the company's current performance ; *Futurevision*$_t$=the number of words used on the company's Facebook page to explain the company's vision or plans ; *Lev*$_t$=total liabilities/total assets ; *Size*$_t$=natural logarithm of total assets ; *ROA*$_t$=net income/total assets ; *Major*$_t$=the largest shareholder's ratio ; *Foreign*$_t$=the foreign shareholding ratio ; *Loss*$_t$=dummy variable, 1 if the net income of the company shows loss, otherwise 0 ; *AGE*$_t$=natural logarithm of (current year − founded year) ; *Donate*$_t$=donation expenses/sales ; *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively.

Table 5 reports the results of the analysis for testing of Hypothesis 2. To investigate the effect of the debt ratio on the positive relation between *SM* and *ADVE*, we include an interaction variable between *SM* and the debt ratio of the company. This interaction term has a coefficient of −0.01901 in Eq. (2), which is significant at the 5% level. The association between *SM* and *ADVE* is weakened, as the debt ratio of the corporation is higher.

〈Table 5〉 The results of testing of Hypothesis 2

| Variable | KOSPI－listed firms (565 firm－years) | | |
|---|---|---|---|
| | Dependent variable : *ADVE* | | |
| | *β* | *t－value* | *Significance levels* |
| *Intercept* | 0.02247 | 2.39 | ** |
| $SM_t$ | 0.0146 | 3.22 | *** |
| $SM_t \times Lev_t$ | －0.01901 | －2.04 | ** |
| $Lev_t$ | －0.00351 | －1.67 | * |
| $Size_t$ | 0.00005 | 0.16 | |
| $ROA_t$ | －0.00844 | －1.97 | ** |
| $Major_t$ | 0.00293 | 1.29 | |
| $Foreign_t$ | －0.01297 | 3.51 | *** |
| $Loss_t$ | 0.00019 | 0.18 | |
| $AGE_t$ | －0.00082 | －1.46 | |
| $Donate_t$ | 1.15218 | 4.88 | *** |
| *Industry* | Included | | |
| *F－value* | 8.47 | | *** |
| *Adj_Rsq* | 25.93% | | |

$ADVE_t$=advertising expenses/sales ; $SM_t$=dummy variable with a value of 1 if a company has its own Facebook account, otherwise 0 : $Lev_t$=total liabilities/total assets ; $Size_t$=natural logarithm of total assets ; $ROA_t$=net income/total assets ; $Major_t$=the largest shareholder's ratio ; $Foreign_t$=the foreign shareholding ratio ; $Loss_t$=dummy variable, 1 if the net income of the company shows loss, otherwise 0 ; $AGE_t$=natural logarithm of (current year－founded year) ; $Donate_t$=donation expenses/sales ; *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively.

Finally, all hypotheses are supported.

# Ⅴ. Discussion

## 1. Main Findings and Implications

The main point of this paper is to demonstrate that a company's advertising costs can be understood in terms of its social media activities. There are several important points to mention

about corporate social media activities as marketing strategies. It has been discussed in the literature, for instance, that company－driven social media activities and advertising costs are interrelated, while customer－driven social media activities do not significantly affect corporate marketing endeavors. This fact motivates companies to adopt social media for advertising and customer service purposes (Parveen et al., 2015). This becomes evident from an inspection of the results of the multiple regression analysis in this study.

Practitioners believe that social media－based marketing is cost effective (Parveen et al., 2015). However, to the best of our knowledge, this empirical study is the first to reveal the numerical relationship between social media activities (posting, liking, uploading, introducing, commenting on posts, uploading content on current outcomes, uploading content on corporate vision, etc.) and advertising costs using actual market data. Although efficiency (i.e., costs) should be considered as part of corporate decision－making regarding usage of social media in marketing strategy, previous researchers have focused mostly on the effectiveness of social media in marketing (e.g., sales, customer engagement, market share, etc.) (Trusov, 2009 ; Hensel, 2010 ; Daniasa et al., 2010 ; Baresch et al., 2011 ; Malhotra, 2013). Although some studies mention the role of social media in cost reduction, they primarily conduct qualitative and inductive analyses based on data from semi－structured interviews (Parveen et al., 2015). In this study, we look at corporate social media activities from a different angle using real Facebook data and financial data from a large sample of firms listed on the Korea Stock Exchange.

Overall, all hypotheses were supported by the data. The results of testing of Hypotheses 1－1 through 1－7 suggest that two core social media activities, posting comments and liking posts or pages/sharing, are very cost－effective ways to engage customers (Gummerus et al., 2012 ; Cvijikj, 2013) and promote word－of－mouth diffusion (Trusov et al., 2009), as expected. On the other hand, the results also reveal that there are costs involved in posting and uploading content related to the company introduction so as to engage customers and promote positive word－of－mouth. Further, using multiple social media in addition to Facebook may also significantly increase advertising costs. Hence, managers of firms must be careful when adding advertising channels via social media, as it may increase costs.

In testing of Hypothesis 2, the results for *Lev* and *ADVE* suggest that companies with higher debt ratios are at higher risk of default and bankruptcy. Therefore, this variable may have a negative (－) effect on spending for advertising purposes. *Size* was not significantly associated with advertising expenses. Larger firm size has been associated with higher political costs (Francis et al., 2004). From the results of *ROA* and *ADVE*, we can deduce that *ROA* have a negative (－)

influence on advertising expenses in the short term. In the analysis, only data from 2014 are used. Therefore, the relationship between advertising expenses and *ROA* must be further investigated to determine the long－term effects. The fact that *Major*, one of the ownership structure variables, is not related to *ADVE* suggests that the largest shareholder's ratio has no apparent relation with advertising expenses, which is similar to results reported in earlier studies related to firm performance (Jensen and Meckling, 1976 ; Morck et al., 1990, McConnell and Servaes, 1990, Demsetz and Villalonga, 2001). In addition, the coefficient value for *Foreign*, the other ownership structure variable, is negative (－) significantly at the 1% level. Foreign investors can act as an outside monitoring force, curtailing managers' behavior in terms of spending on advertising. This result is consistent with those of other researches on the relation between firm performance and foreign investment (Smith et al., 1997 ; McConnell and Servaes, 1990).

Furthermore, the results of testing of Hypothesis 2 indicate that for companies with high debt ratios, more effort is necessary to decrease expenses. Because corporations with higher debt ratios may receive negative evaluations, they must put more effort into decreasing their expenses in order to maximize profit. Therefore, these companies have a great incentive to decrease their costs by even engaging in social media－based marketing, thereby decreasing advertising expenses.

To the best of our knowledge, this study is the first to reveal that the debt ratio affects advertising expenditure and the extent of social media marketing. This result implies to practitioners that financial status (as indicated by the debt ratio of a company) provides signals as to whether or not to increase social media marketing activity. As a proxy for financial risk (Watts and Zimmerman, 1990 ; DeFond and Jiambalvo, 1994), the debt ratio can provide useful information for marketing managers faced with the decision of whether or not to open a Facebook page. Our paper shows the value of future cooperation between researchers of social media like Facebook and those interested in accounting and finance.

## 2. Limitations and Future Research

This paper has a limitation related to data collection on Facebook. Facebook data were only collected from KOSPI－listed companies, and only a single analysis period was considered. Limited data may have caused the coefficients of some control variables to be unexpectedly positive or negative. Therefore, in a future study, the analysis period should be extended in order to obtain more data.

For future studies, an expansion of the research to include social media other than Facebook

may help to generalize the results and implications of our study. In fact, many companies are commonly utilizing multiple social media channels for Internet－based online marketing, such as Twitter, Instagram, and Pinterest. Though Facebook is the most widely utilized social media for online marketing, consideration of these other social media and how they differ is warranted.

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# 소셜 미디어 마케팅이 광고선전비에 미치는 영향

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<요 약>

본 논문은 소셜미디어 활동(예를 들어 마케팅 채널로서 소셜미디어를 사용하여 포스팅, 페이지 에디팅, 댓글 관리, 좋아요 수 관리, 공유 수 관리 등의 활동)과 기업의 운영비용 중 특별히 광고선전비와의 관계를 연구하고자 한다. 또한 기업의 소셜미디어 채택여부와 광고선전비 간의 관계에 부채비율이 미치는 영향에 대해서 연구하고자 한다. 본 연구는 2014년도 565개의 KOSPI 상장기업들을 대상으로 소셜미디어 자료들과 재무자료를 조사하여 실증분석을 수행하였다. 소셜미디어 자료는 페이스북 자료를 사용하였으며, MIS 방법론에 의해 페이스북 API(Application Programming Interface)를 이용하여 JAVA 어플리케이션으로 자료를 수집하였다. 연구결과는 다음과 같다. 소셜미디어 요인 중 기업주도요인(포스팅이나 텍스트를 업데이트 하는 것 등)은 광고선전비와 유의한 양의 관계가 있는 것으로 결과가 도출되었다. 반면에 소셜미디어 요인 중 소비자주도요인(좋아요 수, 댓글 수 등)은 유의한 결과가 나타나지 않았다. 또한 소셜미디어 채택여부와 광고선전비 간의 양(+)의 관계는 기업의 부채비율이 높을수록 그 관계가 완화되는 것으로 나타났다. 저자들이 아는 범위 내에서, 본 연구는 소셜미디어 활동과 광고선전비 간의 관계를 조사한 첫번째 연구로서 실제 소셜미디어 자료를 수집하고 이를 활용하여 실증분석 연구결과를 제시하였다는 데 그 의의가 있다.

**<주제어>** 소셜미디어, 페이스북, 부채비율, 광고선전비, 마케팅 채널

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