

SNS Effect of the negative event on the Firm Performance: Comparison between Pre and Post SNS media appearance

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When the negative event is published, the company tends to go through the negative impact on the firm performance. Especially, with the SNS, the negative event is instantly spread on indefinite region so the impact seems bigger than the period before the SNS media appearance. It seems that everyone considers the SNS media impact on the firm performance quite big. However, there has been no empirical study on the impact comparison on the firm performance between pre and post SNS media occurrence periods. This study tries to empirically compare the impact of the negative event on the firm performance between pre and post SNS media appearance. Our study starts from the basic but not verified question: Does really the negative event have more negative impact in the post-SNS-occurrence period than in the pre-SNS-occurrence period?

In order to examine the impact of the negative publicity on firm performance in two eras, pre and post SNS media appearance, we used CAR (Cumulative Abnormal Resturns) model. By using this model, we could verify the statistical significance of cumulative abnormal returns in market between before and after the events. For event samples, we focused on food manufacturers and collected the negative events from 1991 to 2003 for pre-SNS occurrence period, and from 2010 to 2013 for post-SNS occurrence period. Based on the listed food companies at KOSPI, we researched Naver News Library (newslibrary.naver.com) and Naver News (news.naver.com) for all the individual negative events published for both periods. Firm returns data were collected from TS 2000 (KOCO Info) and market portfolio data were collected from KRX Exchange.

Through our empirical analysis, our finding is interesting to note that the type of events differently influences on the firm performance. With the SNS, the health-related events have influence on the firm performance 'after the event day' whereas the company behavior trust events have influence 'before the event day'. Our findings have implications for management. When a negative event directly related to or threatening customers or their life such as health, it is crucial to fix up the

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situation right after the event occurs. On the other hand, when a negative event is not publicly available information such as company behavior trust, it is important for marketers to strengthen the firms' trust reputation and control the bad WOM before the event.

Key words: SNS, Event Study, CAR Analysis, WOM, Negative event, Firm Performance, Food, Health, Trust

I. Introduction

The top position of noodle business in Korea went through the position switch to Nongshim from Samyang after the negative event that Samyang ramen had used beef tallow was published in the newspapers. Even though the event was later judged innocent in 1995, it still affects the today's ramen business since Samyang could not have returned to the top1 place in the ramen business.

When the negative event is published, the company tends to go through the negative impact on the firm performance. Especially, with the SNS, the negative event is instantly spread on indefinite region so the impact seems bigger than the period before the SNS media appearance. It seems that everyone considers the SNS media impact on the firm performance quite big. However, there has been no empirical study on the impact comparison on the firm performance between pre and post SNS media occurrence periods. This study tries to empirically compare the impact of the negative event on

the firm performance between pre and post SNS media appearance.

The negative contents have powerful role in customers' decision in many industries (Austin 1983; Cameron 1995; Vogel 2001; Walker 1995). As addressed in previous studies, people tend to believe more in the negative contents than in the positive contents (Chevalier and Mazlin 2003). With this tendency, SNS is considered as a crucial issue with risks for marketing (Stenger and Coutant 2009). In the post-SNS-occurrence period, such negative contents seem to proliferate faster in bigger volume.

Previous studies on relation between WOM and the firm performance have not considered the negative impact comparing the two periods, pre and post SNS occurrence periods. And researchers examined the relation between WOM and the firm performance regardless of the direction of WOM either positive or negative. For example, when Kim (2008) showed that the amount of published articles have relation with the stock price, he did not consider the negative event and its impact on stock price. Another previous study (Lee 2012) on SNS

contribution with WOM on sales investigated the number of WOM (postings, twittings, re-twittings) regardless of the direction of WOM either positive or negative.

Unlike the previous studies, this study examines the comparison of two periods of pre and post SNS occurrence especially by focusing on the negative impact on the firm performance. Our study starts from the basic but not verified question: Does really the negative event have more negative impact in the post-SNS-occurrence period than in the pre-SNS-occurrence period?

II. Research Model

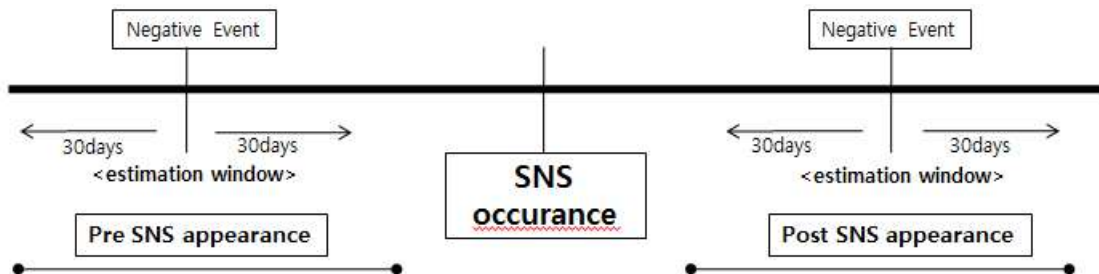
〈Figure 1〉 shows our research model to examine SNS effect of negative viral messages on the firm performance. We measure the firm performances in two eras of pre and post SNS media appearance respectively. We collect the negative events on media publication from both time era of pre and post SNS.

Since it is not possible to clearly cut or simplify SNS occurrence as one point of time, we exclude the time period from 2004 to 2009, and collect the events before 2004 and after 2009, respectively. We did this because we believe the occurrence of SNS is the period that people massively used SNS such as 2004 for Google, 2005 for YouTube, 2008 for Facebook and 2009 for Twitter (Kim 2013, Oh 2010). By excluding the assumed SNS occurrence period, we can minimize the controversial issue on a distinction between pre and post SNS media.

III. Samples

To compare the negative events impact on firm performance between the two periods, pre and post SNS occurrence, we focus on food manufacturers since food business is one of the industries where people tend to take other people's opinion to decide what to buy or where to eat. According to a research on how people make their decisions when they have to choose

〈Figure 1〉 Time line for our event study



what to eat, 60.9% of people listen what other people suggested or recommended, and 27% follow the opinion at internet (Korea Restaurant Information 2009).

As described earlier, we collect the negative events in food industry from 1991 to 2003 for pre-SNS occurrence period, and from 2010 to 2013 for post-SNS occurrence period. Based on the listed food companies at KOSPI, we researched Naver News Library (newslibrary.naver.com) and Naver News (news.naver.com) for all the individual negative events published for both periods.

From these collected events, we screen the similar type of events in the same individual companies as many as possible for both periods of pre and post SNS. In this way, we can compare the impact of the two periods with similar standards. Finally we choose two types of the negative events: 'events directly related to health' and 'events related to company behavior trust'.

IV. Research Methodology

In order to examine the impact of the negative publicity on firm performance in two eras, pre and post SNS media appearance, we follow the traditional event study methodology in which

two main methods are used to examine the short term stock response to the event of interest around the event day.¹⁾ One uses 'market model' which is calculated from subtraction of expected market returns, and the other uses 'market return adjusted model' which is calculated from subtraction of daily-based market returns (Lee 2013). Among them we adopt the first one 'market model' which is widely accepted and used in the finance studies. By using this model, we can verify the statistical significance of cumulative abnormal returns in market between before and after the events.

Firstly, daily abnormal returns of firms are estimated from daily market returns. The estimation window for estimating parameters of market model is (-321, -31) which is the same as Horsky and Swyngedouw (1987), and it measures parameters of α , β through OLS estimation (Lee and Park 2000),

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \epsilon_{i,t}$$

where $R_{i,t}$ and $R_{m,t}$ are defined as the period- t returns on firm i and the market portfolio, respectively, $\epsilon_{i,t}$ as the residual, and α_i and β_i as parameters from OLS estimation for respective firm returns.

The event of this study is the negative publicity of food-related firms, and the event day is publicity day on the negative event occur-

1) We use the event study methodology which is traditionally used for the examination of the significant abnormal returns in previous studies. For details, refer to MacKinlay (1997).

rence for each firm. To verify each hypothesis, it is necessary to analyze the statistical significance for respective estimation window around the event day ($t=0$). The abnormal returns on respective firm are calculated,

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

where t is from -321 days to -31 days of event day, the event window is -30 days and +30 days of event day. Then, calculate the sum of the abnormal returns in the event window days,

$$CAR(T_1, T_2) = \sum_{T_1}^{T_2} AR_t$$

$$CAR_{pt} = \sum_{t=0}^T \frac{1}{N} \sum_{i=1}^N [R_{i,t} - (\alpha_i + \beta_i R_{m,t})],$$

where CAR_{pt} is cumulative abnormal returns on period from p to t . Data for the period- t returns on firm i and the market portfolio are collected from TS 2000 and KRX Korea Exchange; Firm returns data were collected from TS 2000 (KOCO Info) and market portfolio data were collected from KRX Exchange.

V. Results

- **The effect comparison between pre and post SNS occurrence periods: the negative**

events directly related to health

〈Table 1〉 shows the sorted negative events directly related to health issues and the individual CAR values of the days [0 30] after the events published in post SNS media occurrence period.

〈Table 2〉 shows CAR statistics in [0 30] in post SNS media occurrence period, and it shows p-value 0.0945 which is significant at 10% level and CAR value -0.1493. It means that the negative events related with health issues have significant impact on firm performance, and it affects negatively to the firm performance. However, 〈Table 3〉 shows the previous time [-30 -1] of the event occurrence in post SNS media occurrence period with p-value 0.2504 which is not significant. When the negative events were published, 'after the event day' has more negative impact than 'before the event day' in the post-SNS-occurrence period. In fact, 'before the event day' has no significant impact while 'after the event day' has negative impact on cumulative abnormal return.

So far we compared CAR between before and after the event day in the period of SNS existence. Now, our attention needs to be turned to the period of SNS non-existence.

〈Table 4〉 shows the negative events and individual CAR values [0 30] in pre SNS media occurrence period. Again, the data are about the food industry.

<Table 1> health issues at Post SNS media occurrence

Firm	Published date	Event Type	CAR
SEOUL FOODS	2011-04-27	Impure Element Detection	-0.05697
SEMPIO FOODS	2013-08-22	Impure Element Detection (Metal detection), Noodles Sales Suspension	-0.89367
SAMYANG FOODS	2013-06-14	Health Harm Factor Detection found innocent but danger in bankruptcy(Beef tallow)	-0.11158
NONGSHIM	2012-10-24	Health Harm Factor Detection (Cancer causing agent in noodles)	-0.0746
NONGSHIM	2011-06-28	Poor Hygiene	0.026994
NONGSHIM	2010-05-13	Impure Element Detection (Metal detection)	0.040821
NAMYANG DAIRY PRODUCT	2013-08-21	Impure Element Detection (Frog milk power)	-0.71036
NAMYANG DAIRY PRODUCT	2013-07-12	Chemical Substance Suspicion (Coffee causing nausea)	-0.06389
LOTTE CONFECTIONERY	2010-10-07	Obesity Foods	-0.0114
LOTTE CHILSUNG BEVERAGE	2012-10-05	Health Harm Factor Detection (Excessive caffeine in Hotsix)	0.047075
LOTTE CHILSUNG BEVERAGE	2010-10-07	Obesity Foods	0.011247
DONGWON F&B	2013-07-01	Poor Hygiene	-0.05494
BINGGRAE	2010-10-07	Obesity Foods	-0.08915

<Table 2> CAR_{pt} statistics: After event
at Post SNS media

	CAR [0 30]
mean	-0.1493
t-value	-1.82
p-value	0.0945

<Table 3> CAR_{pt} statistics: Before event
at Post SNS media

	CAR [-30 -1]
mean	-0.0239
t-value	-1.21
p-value	0.2504

<Table 5> shows CAR statistics in [0 30] in pre SNS media occurrence period, in which the events are collected and sorted out with the same standard of the post SNS media occurrence period. It shows p-value of 0.5545 which is no significant at 10% level. It means that the negative events related with health issues have no significant impact on firm performance. <Table 6> shows the previous time [-30 -1] of the event occurrence in the pre SNS media occurrence period, and it also shows p-value of 0.3497 which is not significant. When the negative events were published, both of before

<Table 4> health issues at Pre SNS media occurrence

Firm	Published date	Type of events	CAR
SEOUL FOODS	1994.12.11	Unsanitary Food	-0.091009348
SEOUL FOODS	1994.09.16	Health Harm (Spoiled within the expiration date)	0.347900083
SEMPIO FOODS	1994.12.11	Unsanitary Food	-0.045645687
SEMPIO FOODS	1996.03.13	Health Harm (Chemical soy sauce causing possible health problem)	0.369224621
SEMPIO FOODS	1993.07.15	Passed Expiration Date	0.025038457
SAMYANG FOODS	1994.12.11	Unsanitary Food	-0.139384082
NONGSHIM	1991.09.10	Impure Element Detection (Maggots detection in noodle)	0.066766481
NONGSHIM	1991.11.10	Impure Element Detection (Maggots and spider web detection in noodle)	-0.026571926
NONGSHIM	1995.01.12	Health Harm (Imported 'Real Lemon' causing gastritis)	0.026997964
NONGSHIM	1994.10.15	Impure Element Detection (Agricultural pesticides detection in noodle soup)	0.160440126
LOTTE CHILSUNG BEVERAGE	1993.12.15	Health Harm(Causing cavity)	-0.040790359
BINGGRAE	1995.7.22	Impure Element Detection (Bacteria in ice-cream)	-0.189860176
BINGGRAE	1994.12.11	Passed Expiration Date	-0.086728859

and after the event day have no impact on firm performance.

<Table 5> CAR_{pt} statistics: After event at Pre SNS media

	CAR [0 30]
mean	0.029
t-value	0.61
p-value	0.5545

<Table 6> CAR_{pt} statistics: Before event at Pre SNS media

	CAR [-30 -1]
mean	-1.1848
t-value	-0.97
p-value	0.3497

Then, by comparing between pre and post SNS occurrence, we can argue that the published negative events in the post-SNS-occurrence period have more negative impact on firm performance than in the pre-SNS-occurrence period. In fact, we could not find any impact at the pre-SNS-occurrence. Thus, our empirical finding is consistent with the previous studies that insist SNS communication makes massive impact on sales (Miroslav, Ivan and Miroslav 2010). Furthermore, also note that our finding also indicates that in the post SNS occurrence period the negative events directly related with health issues have significant impacts on firm performance only after the event,

but not before the event.

- **The effect comparison between pre and post SNS occurrence periods: the negative events related to company behavior trust**

The negative events related to company be-

havior trust such as improper pricing, price collusion and unfair coercion towards agencies are shown in <Table 7>. Unlike directly health-related food events, we believe company-behavior-related events in the food businesses may not have impacts as significant as health-related events since people can respond at different degrees. The events for company behavior

<Table 7> company trust at Post SNS media occurrence

Firm	Published date	Type of events	CAR
BINGGRAE	2013-05-22	Suggested Retail Price Not Indicated	-0.14945
BINGGRAE	2010-12-20	Price Collusion On The Milk	0.025554
NAMYANG DAIRY PRODUCT	2013-06-19	Harmed Agencies' Negotiation Broken Down	-0.067
NAMYANG DAIRY PRODUCT	2013-05-20	Unfair Coercion Towards Agencies	-0.14297
NAMYANG DAIRY PRODUCT	2013-05-09	Denunciation Press Conference	-0.18226
LOTTE CHILSUNG BEVERAGE	2013-08-25	Price Collusion On The Juice	0.126877
LOTTE CHILSUNG BEVERAGE	2013-07-30	Intentional Defamation Of Rival Company (Negative Article Published of Rival Company, 'HITE')	-0.02637
LOTTE CHILSUNG BEVERAGE	2013-02-20	Increase In Price Even When Raw Materials Price Decreased	0.015492
LOTTE CHILSUNG BEVERAGE	2012-08-14	Price Trickery (Increasing Good Selling Products and Decreasing Bad Selling Products)	-0.00212
LOTTE CHILSUNG BEVERAGE	2012-07-16	Individual Proprietors Boycott (Ignoring Individual Proprietors Demand)	0.061717
LOTTE CHILSUNG BEVERAGE	2012-01-05	Price Collusion	-0.22438
LOTTE CHILSUNG BEVERAGE	2011-12-02	Publishing Article Only When Decrease Price (Even When Increase Price Far More Products)	-0.08797
BOHAE	2011-07-20	Suspicion of Company Director Embezzlement	-0.06257
BOHAE	2011-06-23	Suspicion of CEO Fraud	0.260726
SAMYANG FOODS	2012-08-16	Price Collusion	-0.02827
SAMYANG FOODS	2012-08-14	Price Trickery (Increasing Good-Selling Products and Decreasing Bad-Selling Products)	-0.03025
SINSEGAE FOOD	2013-01-08	Unfair Support to Affiliated Bakery	-0.09326

trust are sorted out as many as possible by the similar types and the same companies applying into the two periods, pre and post of SNS occurrence. <Table 7> shows the sorted negative events related to company behavior trust and the individual CAR values of the days [0 30] after the events published in post SNS media occurrence period.

<Table 8> shows CAR statistics in [0 30] in post SNS media occurrence period, and it shows p-value 0,2284 which is not significant at 10% level. It means that the negative events related with company behavior trust have no significant impact on firm performance. However, <Table 9> shows the previous time [-30 -1] of the event occurrence in post SNS media occurrence period, and it shows significant p-value of 0,0055. Interestingly, this is opposite to the result from directly health-related issues. At the time with SNS, we find that the negative event has significant impact on firm performance before the event day, but not after the event day.

This interesting finding can be explained with the previous literatures. Investors tend to follow the financial analysts' suggestion before they buy or sell. For example, Amazon.com's stock sank by 19% in one day due to the critic by Lehman Brothers Inc. (Business Week, July 10, 2000). Unlike health-related events, we believe company behavior trust events are not well known to public. Thus, analysts can deliver extra value to public investors before the events. Even before the event day, the analysts' col-

lected specific private information of the companies may be significant to a firm's future and financial strength (Ivkovic and Jegadeesh 2004, Womack 1996). Thus, the recommendations of analysts at least affect the mediation effect of customer satisfaction on firm abnormal returns, systematic risk, and idiosyncratic risk (Luo et al 2010). Since analysts affect investors with specific private information, the impact of the negative events related with company behavior trust already have started to work even before the event is published, perhaps easily with SNS. As time goes by, the impact of the negative WOM on firm performance decreases (Basuroy and Chatterjee 2003, Liu 2006) and this can be insignificant impact of 'after the event' with company behavior trust.

<Table 8> CAR_{pt} statistics: After event at Post SNS media

	CAR [0 30]
Mean	-0.0357
t-value	-1,25
p-value	0,2284

<Table 9> CAR_{pt} statistics: Before event at Post SNS media

	CAR [-30 -1]
mean	-0,0669
t-value	-3,2
p-value	0,0055

<Table 10> shows the negative events and

<Table 10> company trust at Pre SNS media occurrence

Firm	Published date	Type of events	CAR
BINGGRAE	1999.5.20	Exaggerated Advertisement (Raw Materials, Nutrition Elements)	0.012552
BINGGRAE	1992.8.21	Unfair Supplying of Giveaway	0.113306
BINGGRAE	1994.11.09	False Indication of Content	0.033179
BINGGRAE	1996.06.24	Price Collusion On The Milk	-0.08673
NAMYANG DAIRY PRODUCT	1992.12.09	False Indication of Expiration Date	0.045634
NAMYANG DAIRY PRODUCT	1996.12.25	Exaggerated Advertisement (The best company in milk products)	0.124712
NAMYANG DAIRY PRODUCT	1998.06.12	Imposed Penalties on Powdered Milk Fluctuation	-0.10885
NAMYANG DAIRY PRODUCT	1997.02.06	Exaggerated Advertisement (Not Verified Teeth Strengthen Elements)	0.25793
NAMYANG DAIRY PRODUCT	1995.01.26	Exaggerated Advertisement (Taking Advantage Of Pesticide Residue Test)	0.101859
NAMYANG DAIRY PRODUCT	1996.06.24	Price Collusion On The Milk	0.226182
LOTTE CHILSUNG BEVERAGE	1999.11.24	Monopoly Issue	-0.04115
LOTTE CHILSUNG BEVERAGE	1991.02.02	Price Collusion	-0.02773
BOHAE	1995.02.17	Exaggerated Advertisement (Oxygen)	-0.34691
SAMYANG FOODS	1996.08.01	Discharge of Environmental Pollutant	-0.10293
SINSEGAE FOOD	1992.07.11	Exaggerated Food Package	-0.23597

individual CAR values [0 30] in pre SNS media occurrence period.

<Table 11> shows CAR statistics in [0 30] in pre SNS media occurrence period, in which the events are collected and sorted out with the same standard with the post SNS media occurrence period. <Table 11> shows p-value of 0.9565 which is not significant at 10% level. This implies that the negative events related with company behavior trust have non-sig-

nificant impact on firm performance. <Table 12> shows the previous time [-30 -1] of the event occurrence in the pre SNS media occurrence period, and it shows insignificant p-value of 0.749. Thus, there is no impact of negative events both before and after the event day at the time of no SNS. This result is not different from the one with the directly health-related results at the pre SNS period.

⟨Table 11⟩ CAR_{pt} statistics: After event
at Pre SNS media

	CAR [0 30]
mean	-0.00233
t-value	-0.06
p-value	0.9565

⟨Table 12⟩ CAR_{pt} statistics: Before event
at Pre SNS media

	CAR [-30 -1]
mean	0.0117
t-value	0.33
p-value	0.749

When it comes to the comparison of firm behavior trust between pre and post SNS occurrence, we can argue that the published negative events in the post-SNS-occurrence period have more negative impact on firm performance than in the pre-SNS-occurrence period. In fact, we fail to find any significant impact at pre-SNS-occurrence. However, interesting enough, we also find that in post SNS occurrence period the negative events with firm behavior trust have significant impact on firm performance only before the event, but not af-

ter the event.

VI. Conclusion

This study contributes to the researchers on following aspects. First, this study empirically verified the impact comparison of the negative events between pre and post SNS media occurrence periods, shown in ⟨Table 13⟩. While previous studies limited their focus on the period of time with SNS, we expand the research horizon into both pre and post SNS periods. Secondly, by adopting the CAR model to our empirical analysis, our finding is interesting to note that the type of events differently influences on the firm performance. With the SNS, the health-related events have influence on the firm performance ‘after the event day’ whereas the company behavior trust events have influence ‘before the event day’.

Our findings have implications for management. When a negative event directly related to or threatening customers or their life such as health, it is crucial to fix up the situation right after

⟨Table 13⟩ Summary of results

CAR values	Pre SNS		Post SNS	
	Before events	After events	Before events	After events
directly health related events	-1.1848	0.029	-0.0239	-0.1493*
company behavior trust related events	0.0117	-0.00233	-0.0669*	-0.0357

the event occurs since SNS works negatively on firm performance especially after the event. On the other hand, when a negative event is not directly related to consumers and often is not publicly available information such as company behavior trust, it is important for marketers to strengthen the firms' trust reputation and control the bad WOM before the event or the negative publicity occurs. It is because the impact of private information such as company behavior trust has already started to negatively work perhaps easily with SNS even before the event is published

While it has shown the comparison of negative events between pre and post of SNS, our study has only touched the food business. Many other industries should be investigated in the future research for generalizing our findings.

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