UNDERSTANDING INFORMATION RELAY OF BRAND SNS: EVIDENCE FROM ANALYSIS ON A DEPARTMENT STORE TWITTER

Completed Research Paper

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Abstract

Social network service such as Twitter becomes a significant means to support communicative practice. There have been a large number of studies focusing on topic detection, follower recommendation, and information spread. However, previous studies overlooked a critical question about the use of brand Twitter regarding what information is being spread and why certain information is being spread more widely than others. This paper examines the practice of retweeting by analyzing the effect of the brand Twitter when it comes to the actual behavior of disseminating information. Moreover, our study provides empirical data that the brand Twitter can be used actively for the WOM. We assure that the study is one of the novel approaches that examined the users' message relay activities pertaining to the brand Twitter.

Keywords: Information Replay, Information diffusion, brand Twitter, retweet

Motivation and Purpose

Internet network significantly changed the way that companies form relationships with the customers. It consolidated its position as an effective and efficient channel for publicizing products or services to customers, for embracing customers' demand and for solving issues. In particular, it overcomes the limitations of time and space to make an environment in which companies can interact with customers any time, any place. This kind of trend was reinforced due to the spread of all types of smart devices and mobile Internet. Furthermore, ideologies on the Internet such as cooperation, co-existence, participation in the society and knowledge contribution that were triggered by the Web 2.0 to urge the companies to assume a new perspective as they carry out customer relationship management via Internet network.

In the case of the offline, a companies' brand is recognized as having a personification character with customer relationship establishment (Palmer 1996). Customers can develop emotional relationships with a company brand just like interpersonal relations. Meanwhile, companies can use this relationship to build long-term brand loyalty (Fournier 1998). The Social Web matured by the Internet industry and customers' active participation can strengthen the close interaction between the company brand and customers. It is possible because both the company brand and customers exist as the same "users" of the Social Web. For example, Facebook's Nike page has an environment that is the same as the ordinary users' site. Moreover, ordinary users communicate with the Nike in the same way that they communicate with other people. They exchange messages as well as photos and VODs, and express their sympathy for specific messages.

The Social Web design motivates customers to participate in the marketing activities in a more active manner. From early on, there was an attempt to leverage customers' social relations as the channels for all types of marketing promotions (Richins and Root-Shaffer 1988). Social relations built on the Internet network can increase the WOM (Word of Mouth) effect (Hennig-Thurau et al. 2004). By intervening in the customers' network, companies want to gain the power to control and to maneuver the WOM (Word of Mouth). Goldsmith and Horowitz (2006) claimed that customers can actively acquire the information on the products and services via online. When product information or evaluation is distributed voluntarily among the ordinary customers, volume of products sold tends to be increased (Davis and Khazanchi 2008). If a company brand can penetrate into the Social Web where regular customers are active and managing to consolidate its position as an important source of an information provider for the customer, then this can increase the effect of customer relationship management (Piskorski 2011).

Among the Social Web sites, Twitter is known as the most powerful Social Network Service (SNS). Twitter is simplicity itself. When a user uploads a simple message comprised of 140 characters, on his or her Timeline, then this message is delivered to numerous users. The parties who received the message can post up their opinion in the form of replies or deliver their messages to other people. Moreover, it is possible to have the messages including the Hashtag get exposed for the benefit of the public who are interested in a specific topic. In other words, Twitter built a vast, instant and online WOM network by endowing social network characteristics to the Short Message Service (SMS). Jansen et al. (2009) demonstrated that about 19% of the Twitter messages are about brands after analyzing 150,000 Twitter messages. Hartzel et al (2011) interviewed a manager to demonstrate that the companies are trying to optimize the WOM via online by leveraging the *brand Twitter*. Smith et al (2012) demonstrated that the activities pertaining to the opinion formation regarding brands took place actively on Twitter. Likewise, this research shows the possibility of using Twitter in relation to the brand Twitter.

Previous studies overlooked a critical question regarding the use of the brand Twitter. The question is, whether it is possible to build the opinion of the Twitter users about brand Twitter. When a message delivery process is examined, the way that brand Twitter sends messages to ordinary users is merely that of the broadcasting phase. However, the WOM started only when there is the message relay phase in which a message delivered to a user is delivered to another user. The issue is how the customer executed the message relay phase. If a customer who participates in the message relay phase recognizes the brand Twitter as a source of information, then there is a high possibility that the brand Twitter is related to specific topics with specific rules. However, if a customer reacts randomly towards a message of the brand Twitter, then we are bound to be skeptical about the effect of the brand Twitter. If this is not verified objectively, then it is virtually impossible for all types of strategies that seek use of the brand Twitter to be realistic.

To resolve the aforementioned problem, this study conducted analysis on the source of the retweet messages by the users who are interested in the brand Twitter. If there is a correlated sense of direction from the sources of the

messages, and if this is related to the companies' Twitter, then it would be possible to verify that the brand Twitter deeply intervenes in the customers' message relay phase. This study expanded on the investigative research conducted by Jansen et al. (2009) to demonstrate the effect of the brand Twitter when it comes to the actual behavior of disseminating information. Moreover, compared to the study conducted by Hartzel et al. (2011), most of the messages that appeared in the relay phase were analyzed by data mining techniques. As such, our study provides empirical data that the brand Twitter can be used actively for the WOM. We assure that the research is one of the novel approaches that examined the users' message relay activities pertaining to the brand Twitter by applying the Association Rule analysis.

Research Background

Retweet as an Information Relay Behavior

Micro blogging becomes an emerging method of communication between the Internet users. It differs from a traditional blogging behavior in that a user typically writes a small amount of text with a more efficient manner. Since the messages should be wrapped by a minimal size of container, the user needs to find a better way to express feelings, impart important information and deliver an urgent warning. The popularity of smart phones accidently increases the utility of micro blogging. People take pictures, record movies, and even collect geographical information with smart phones, which are powerful handheld computers to use the mobile Internet. Using micro blog services, people can easily, conveniently share digitized materials to amuse friends or participate in a social movement (Oh et al. 2010).

Twitter, a company based in the U.S, becomes a de facto standard of micro blogging services. Since it started in July 2007, the number of Twitter users has increased enormously (Twitter 2011). The basic method of using Twitter is to send a message containing only 140 characters to an audience. If a user wants to hear from another user, the only thing she/he has to do is to click the "Follow" button on Twitter. Although there is a countermeasure to filter out unwanted visitors, majority Twitter users open his or her site to everyone who wants to connect. Figuratively, doing Follow is to become a news subscriber. If she/he has done the activity, every message created by the friend automatically flows into his or her personal Twitter site. Many Twitter users follow a friend because she/he is interested in messages published in Time Line, a kind of bulletin board of Twitter site (Java et al. 2007). Weng et al. (2010) argue that many Twitter users follow back because they want to expand information sources for hearing interesting news.

Retweet refers to relay a Twitter message or a tweet. It is a quick and simple way to produce a message by copying other's messages. In Twitter, retweeted messages can be uniquely identified by a tag, RT. Usually, the retweeted message contains an original author's name; hence, the message conveys not only content but also its authority. Then, why do people retweet? Boyd et al. (2010) suggests from a qualitative survey that retweeting can be associated with certain values of the original information items. To amuse followers by introducing interesting stories, a user can relay messages from his or her friend. Or the user can send retweet messages to express consent on certain social opinions. Overall, the findings of Boyd et al. (2010) generally prove that retweeting is a kind of information selection behavior to discover valuable sources of conversation.

Several studies investigated Twitter data to find out effective methods of recommending sources of interesting conversations (Armentano et al. 2011; Chen et al. 2010). Oh et al. (2010) suggest that more sensitive information can have more chances to be retweeted. Kwak et al. (2010) shows retweeting can be a primary source for acquiring new information. Those studies contribute to expanding our knowledge on how retweets can impact our social relationships and conversations in Twitter. However, they did not emphasize how and why retweeting can be a source of business power. Specifically, they commonly agree that retweeting is an important and powerful information relay behavior that is hardly imitated by other kinds of communication channels; whereas, they did not investigate the question whether or not messages sent by a representative of a company can also have a great impact on usual customers in Twitter.

The Value of Retweet in Business

Viral marketing's potential value is increasing everyday due to the growth and advancement of the Internet network (Helm 2000). Subramani and Rajagopalan (2003) classified viral marketing into four types depending on the degree

of network externality and on the recommendation role of users who participate in the viral marketing. Although users do not actively intervene in information delivery, they can have certain information exposed on their social network. On the other hand, there are instances in which the information is distributed in a way that the marketers did not intend as the users actively deliver or publicize information. Because two streams result additionally depending on the scope of the effect that is gained by adopting each of the behaviors, there are four scopes of viral marketing.

Figure 1 compares each of the scopes and the viral marketing scenario on Twitter. In the case of the Twitter system, once one follows a user, then the message that the user drafted in person or retweet is delivered to another user instantly. In other words, the information that is listed on the user's Time Line assumes a very high level of externalities. Meanwhile, if a user desires, it is also possible to deliver information one on one via dialogue. In this case, the level of externalities is very low. Moreover, message of the brand, Twitter cannot be delivered directly. When the Twitter's retweet function is used, most of the Twitter messages are delivered without getting screened. On the other hand, it is possible for a user to recommend a product or service one on one by using customary means such as e-mail. Accordingly, as the Figure 1 shows, Twitter can be used as a tool of viral marketing from all aspects.

Externalities	Passive	Active
High	**Signaling Use, Group Membership** Writing public Tweet messages that involve information on goods or services	**Motivated Evangelism** Writing Retweet messages that involve marketing promotion messages or relevant hyperlinks
Low	**Awareness Creation, Benefits Signaling** Use of direct messages including Hashtags or external hyperlinks for reaching marketing promotion messages	**Targeted Recommendation** Directly recommending goods or services using direct messages.

Recommendation Role

Figure 1. Viral Marketing and Retweet (adopted from Submarani and Rajagopalan, 2003, p. 302)

In order for viral marketing to be effective, customers should be convinced so that they actively disseminate messages into their network or to be able to persuade other users to participate in the marketing promotion, as intended by the marketers. Social Information Processing Model can be considered a theory that can explain the levers that bring out the voluntary action of the customers who belong to a small group in the social network. According to the Social Information Processing Model, significance and value of the information that is communicated by the members of a society are the socially constructed outcomes (Pfeffer 1982). Although judgment of the objective and individual value when it comes to information exerts a considerable effect on decision-making, social constraints can exert a significant effect as well (Salancik and Pfeffer 1977). In particular, behavior or attitude of others in the past affects the behavior of the people who face similar situations (Bem 1972, Salancik and Pfeffer 1977). People who face a similar situation or who are interested in similar topics have the desire to form ties with likeminded people (Schacter 1959). The intrinsic characteristic of the homophily that is formed through this can affect the process with which applicable members acquire and process information in a powerful manner (McPherson and Smith-Lovin 1987).

In order for the Social Information Processing Model to assume explanatory power, company website, which is the first entity of viral marketing needs to be recognized as a member of the society as well. The boundary between an ordinary user and brand site is rather vague within the social network service. They are building an identity within the same environment using the same method. In particular, SNS' brand site can be considered as having

personification qualification since it can interact with customers' solidarity in the society (Fourier 1998). Customers who purchase product or use service want emotional interaction with the companies in addition to the effect from use (Palmer 1996). This kind of demand can be satisfied by transforming the SNS into a character with a specific name called the brand within the virtual space.

Methodology

Association Rule Mining

Association rule mining (ARM in short) is a well-known data mining technique to discover an interesting relation between variables in large databases. Following is the original definition by Agrawal et al. (1993). Recently ARM is employed to many application areas including Web usage mining, bioinformatics and micro-blogging.

Let $I = \{i_1, i_2, \dots, i_n\}$ be a set of n attributes called items. Let $D = \{t_1, t_2, \dots, t_n\}$ be a set of transactions called the database. Each transaction in D has a unique transaction ID and contains a subset of the items in I. A rule is defined as an implication of the form $X \Rightarrow Y$ where $X, Y \subseteq I$ and $X \cap Y = \phi$. The sets of items (for short item sets) X and Y are called antecedent (left-hand-side or LHS) and consequent (right-hand-side or RHS) of the rule respectively (Agrawal et al 1993). For example, the rule {Onion, Beer} ➜ {Burger} found in the sales data of a supermarket would indicate that if a customer purchases onions and beer together, he or she is likely to also purchase hamburger meat. Such information can be used to decide marketing activities such as product placement and price promotion.

Data mining techniques can yield insightful and intuitive results of hidden characteristics of Twitter data (Kwak et al. 2010). To our knowledge, this study is the first research on information relay phenomenon adopting ARM. In assumption, we regard a set of retweets as a set of purchase items since retweeting accompanies by a series of decision making procedures like shopping: (1) messages are delivered; (2) a user reguarly visits his or her Twitter site; (3) A tweet message is selected to be relayed; and (4) His or her followers read the retweet message. Shopping may reduce disposal income, whereas retweeting may increase utility of Twitter user's site. However, false retweeting may eventually decrease user's influence to his or her followers; therefore, we can assume that retweeting involves risk of selection as the same for shopping.

We adopt the Apriori algorithm (Agarwal and Srikant 1994; Goethals and Zaki 2004). To conduct ARM, the R statistical language (R 2012) is used with Arules and AruleViz packages (Hahsler et al. 2011; Hahsler and Chelluboina 2012). Those are helpful in representing ARM results visually thus reducing complexity of understanding findings.

Data Collection

We analyze the 30,501 Twitter users that follow Shinsegae Department Store in Korea. Among them, we collect the data of 18,220 users who re-tweeted at least once (effective data of 59.74%). The data is collected from November 6, 2009 to September 2 and the size of data is 1,956,056 which is equivalent to 14 re-tweets on the average. (p-value < 0.000).

Data collection is performed by using RESTful API provided by Twitter and the data collecting system is built using Python 2.7.3. The following is the procedure of collecting and analyzing the data: we modify the part the Tweepy package, receive the data from Twitter, save the data in the form of object file, create the SQLite3 DB using the data collector and analyze with the R projector

Shinsegae Department Store is the largest department store company in Korea and the world. Setting the records as the world's largest department store, Shinsegae Centum City in Busan, listed in the Guinness Book of World Records("world's largest department store, in June, 2009), 9 branches nationwide(the largest across the country). It began the business as the branch of Japan's Miscosi Department Store in October 1930. In 1955, it was known as Donghwa Department Store. In 1963, it was renamed to Shinsegae Department Store after it was acquired by the Samsung Group. It was spun off from Samsung Group in 1991 and renamed to Shinsegae Co.,Ltd in 2001. It is not only the brand-maker, but also trend-maker that introduces more than thirty worldwide premium brands in Korea.

There are two reasons that we select followers of Shinsegae Department Store as subject of data collection. First, Shinsegae Department Store actively uses Twitter as a marketing tool from 2009 when Twitter is introduced to the

Korean in earnest. Second, as a trend leading company, Shinsegae Department Store promotes the event and sale by Twitter. There is a high possibility that the followers of Shinsegae Department Store acquire the qualified information and shows the actual information relay behavior. In addition, Department store domain deals with various themes; therefore individual difference will be less.
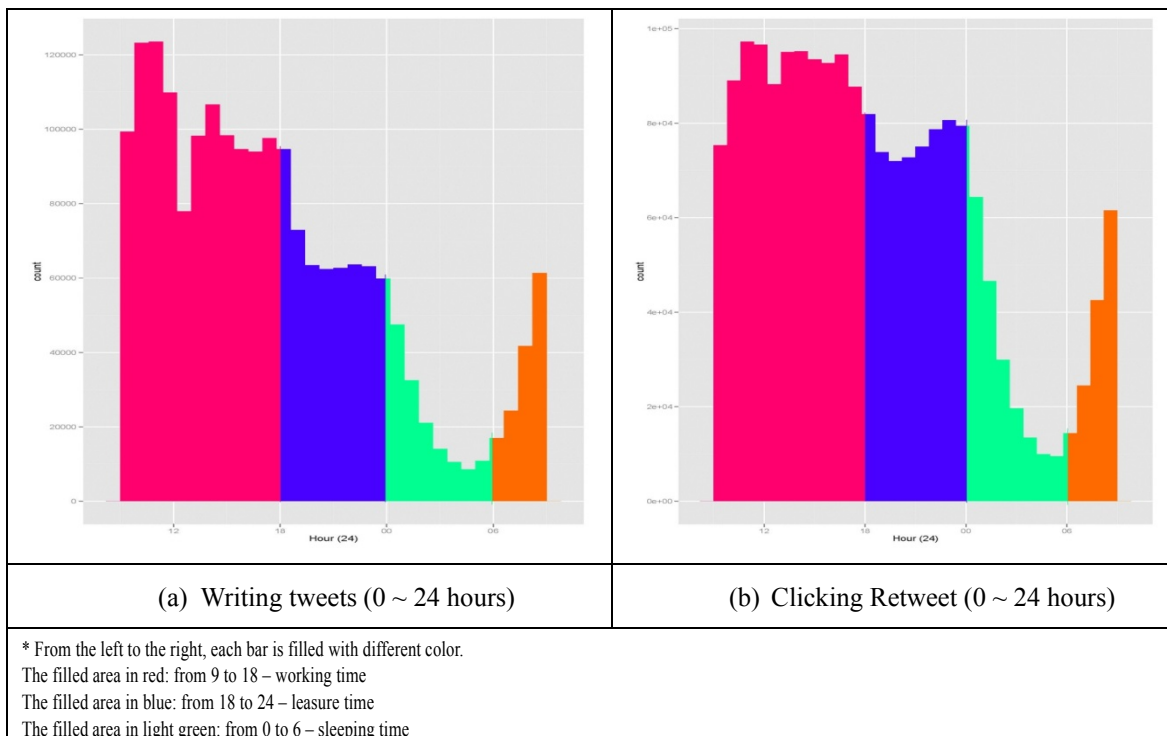
Result

Descriptive Analysis

In Table 1, summary of data is shown. As shown in Table 1, the proportion of those who provide the tweet is 1.352 times larger and the average number of friends is 2.854 times larger. Above all, the average number of followers is 11.558 times larger. It means that the tweet for the RT in our data is by the influential twitter users because all proportions are larger. Particularly, the number of the followers can be the critical evidence.

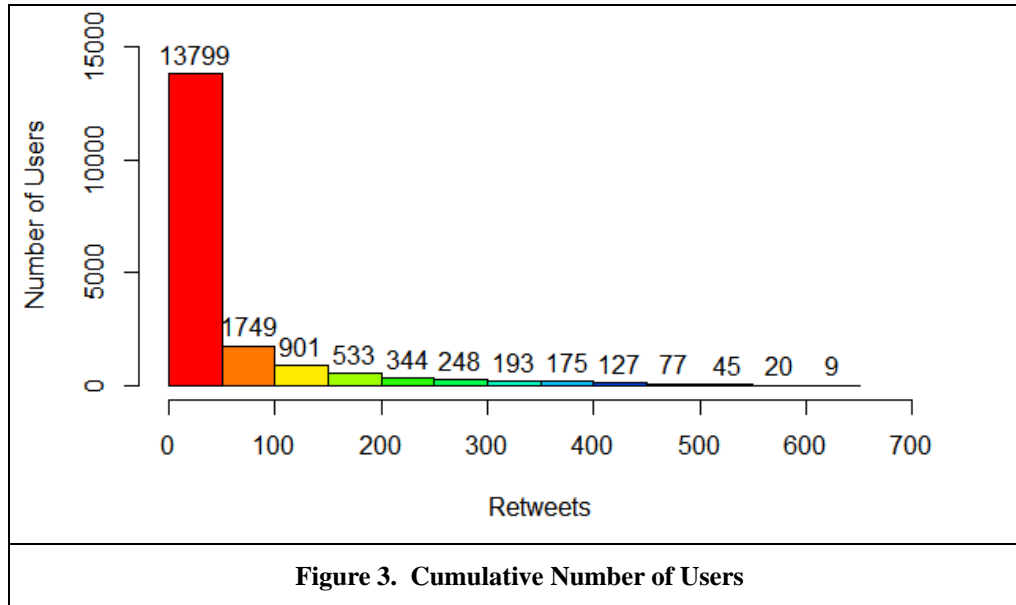| Table 1 Descriptive Analysis on Tweeter Users			
	Retweet Side(rs)	Tweet Side(ts)	Ratio(ts/rs)
Average number of tweets	13,652	18,459	1.352
Average number of friends	7,389	21,088	2.854
Average number of followers	7,333	84,756	11.558

In Figure 2, the time distribution of data is shown. The left side is the ratio of average tweet posting on Twitter and the right side is retweet. Color differentiation is based on the time zone. In detail, red color means the major hours of activity (from 9 to 18), blue color means evening hours, green color means day break and yellow color means early morning. As shown in Figure 2, the tweet and retweet generates actively during the daytime hours. The tweet generation slows down during the evening hours, but increases as the evening turns to night. In other words, most Koreans are involved in social activities during the evening hours, and RT activities increase during those hours.

(a) Writing tweets (0 ~ 24 hours)	(b) Clicking Retweet (0 ~ 24 hours)

* From the left to the right, each bar is filled with different color.
The filled area in red: from 9 to 18 – working time
The filled area in blue: from 18 to 24 – leisure time
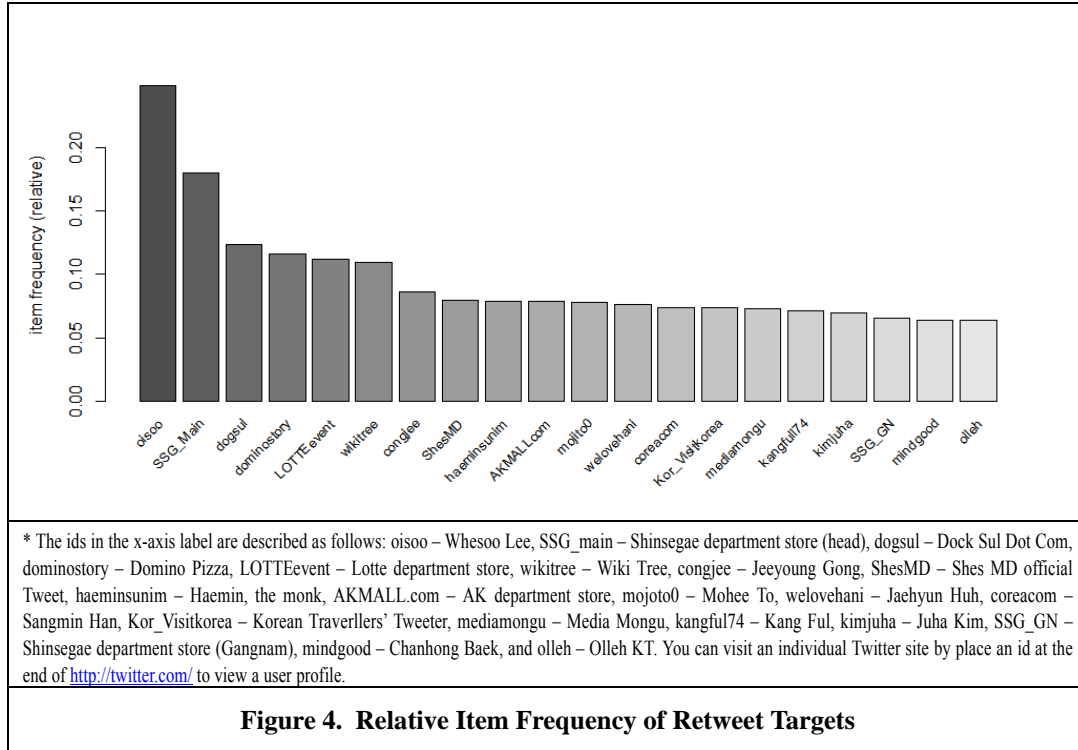The filled area in light green: from 0 to 6 – sleeping time

The filled area in light brown: from 6 to 9 – preparation for working

Figure 2. Time Distribution

In Figure 3, the cumulative number of users by retweets is shown. The number of users who retweets less than 100 is 15,548 and its portion is 85.33% of all users. The number of users who retweets more than 100 and less than 200 is 1,434 and its portion is 7.87% of all users. Those two groups account for 93.2% of all. As shown in the Figure 3, the overall distribution has the long-tail.

Figure 3. Cumulative Number of Users

In Figure 4, the relative item frequency of retweet target is shown. It is RT frequency plot based on the ID of the users who generated the tweet for the retweet. Among the 6 users who have one or more relative frequency, half of the users are a company twitter which provides the product information. SSG Main (Shinsegae Department Store), dominostory (Domino Pizza), LOTTEevent (event of Lotte Department Store) and Lee Whesoo who has the progressive inclination have the largest number of retweet in a relative sense. Especially, Lee Whesoo, a famous novelist and poet in Korea, has more than 1.45 followers, 20,000 friends and 8,700 tweets. As shown in Figure 4, among the 20 tweeter, the number of corporate tweeter stands at 8 which accounts for 40%.

* The ids in the x-axis label are described as follows: oisoo – Whesoo Lee, SSG_main – Shinsegae department store (head), dogsul – Dock Sul Dot Com, dominostory – Domino Pizza, LOTTEevent – Lotte department store, wikitree – Wiki Tree, congjee – Jeeyoung Gong, ShesMD – Shes MD official Tweet, haeminsunim – Haemin, the monk, AKMALL.com – AK department store, mojoto0 – Mohee To, welovehani – Jaehyun Huh, coreacom – Sangmin Han, Kor_Visitkorea – Korean Traverllers' Tweeter, mediamongu – Media Mongu, kangful74 – Kang Ful, kimjuha – Juha Kim, SSG_GN – Shinsegae department store (Gangnam), mindgood – Chanhong Baek, and olleh – Olleh KT. You can visit an individual Twitter site by place an id at the end of http://twitter.com/ to view a user profile.

Figure 4. Relative Item Frequency of Retweet Targets
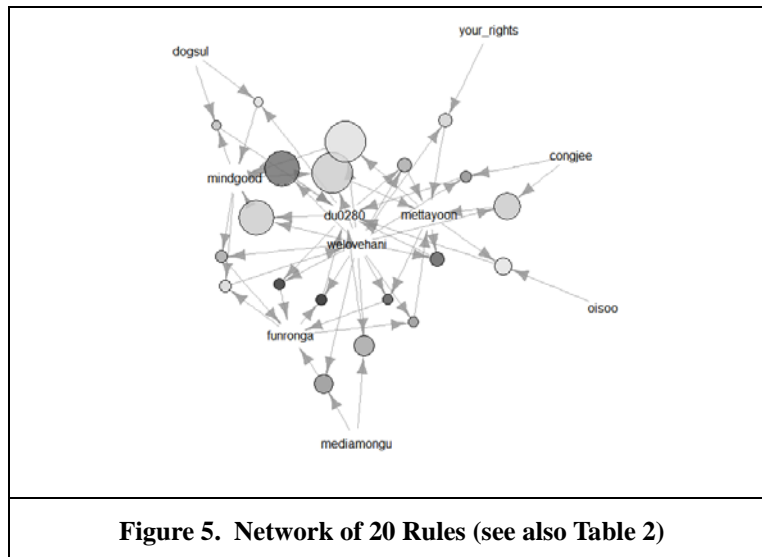
Information Relay Consistency

In Table 2, the description of the Top 20 association rules in Life is shown. Regarding the 1,956,056 retweet data, we calculated the association rule about the retweet authors who are targeted for the retweet. Table 2 shows the association rule, support, confidence, and lift value of the top 20 tweets based on the lift value. The number of tweeter users, which is presented in the LHS and RHS of the Table, is 10 in all. The interesting result is that these 10 users overlap very often. In particular, based on RHS, Seo Yeong-seok (follower = 56,548, tweets = 44,347 on 10 September, 2012), Kim Yong-min(follower = 347,150, tweets = 8,284 on 10 September, 2012) and RainMaker (follower = 42,504, tweets = 31,306 on 10 September, 2012) appear frequently and these twitter users are the critics who share the same political inclination. In other words, they can be categorized into the same group based on the tendency towards the politics and economics.

Table 2. Description of Top 20 Association Rules

Rank	Left-Hand Side (LHS)	If then	Right-Hand Side (RHS)	Support	Confidence	Lift
1	{YM Kim, JY Huh}	-->	{YS Suh}	0.02020	0.68148	14.17419
2	{YS Suh, JY Huh}	-->	{YM Kim}	0.02020	0.65018	13.95314
3	{RainMaker, JY Huh}	-->	{YM Kim}	0.02009	0.61616	13.22316
4	{RainMaker, JY Huh}	-->	{YS Suh}	0.02047	0.62795	13.06071
5	{CY Back, JY Huh}	-->	{YS Suh}	0.02244	0.61411	12.77301
6	{JY Kong, JY Huh}	-->	{YS Suh}	0.02020	0.58974	12.26613
7	{MD Mongu, JY Huh}	-->	{YM Kim}	0.02091	0.56866	12.20368
8	{YM Kim, JY Huh}	-->	{RainMaker}	0.02009	0.67778	12.17861

9	{MD Mongu, JY Huh}	-->	{YS Suh}	0.02108	0.57313	11.92067
10	{CY Back, JY Huh}	-->	{YM Kim}	0.02025	0.55405	11.89030
11	{YS Suh, JY Huh}	-->	{RainMaker}	0.02047	0.65901	11.84139
12	{Doksul, CY Back}	-->	{YS Suh}	0.02003	0.55387	11.51998
13	{JY Kong, JY Huh}	-->	{RainMaker}	0.02162	0.63141	11.34546
14	{CY Back, JY Huh}	-->	{RainMaker}	0.02300	0.62913	11.30447
15	{YS Suh, JY Huh}	-->	{CY Back}	0.02245	0.72261	11.30132
16	{JY Huh, Your_rights}	-->	{RainMaker}	0.02036	0.62563	11.24164
17	{YM Kim, CY Back}	-->	{JY Huh}	0.02025	0.85023	11.13673
18	{Doksul, YS Suh}	-->	{CY Back}	0.02003	0.70600	11.04142
19	{RainMaker ,JY Huh}	-->	{CY Back}	0.02300	0.70539	11.03189
20	{RainMaker, Oisoo}	-->	{YS Suh}	0.02075	0.52720	10.96521

In Figure 5, the network diagram based on the correlated rules is shown. The larger circle has higher support value, and the darker shade shows higher lift value. As shown in Figure 5, there exists a clear loop between rules. That means users have a circulating tendency of relaying messages produced by a group of Twitter users who share the same interest. A follow-up survey revealed that the group was inclined to voice criticisms on conservative government policies. Majority of the group members delivered aggressive, unfiltered messages on public issues.

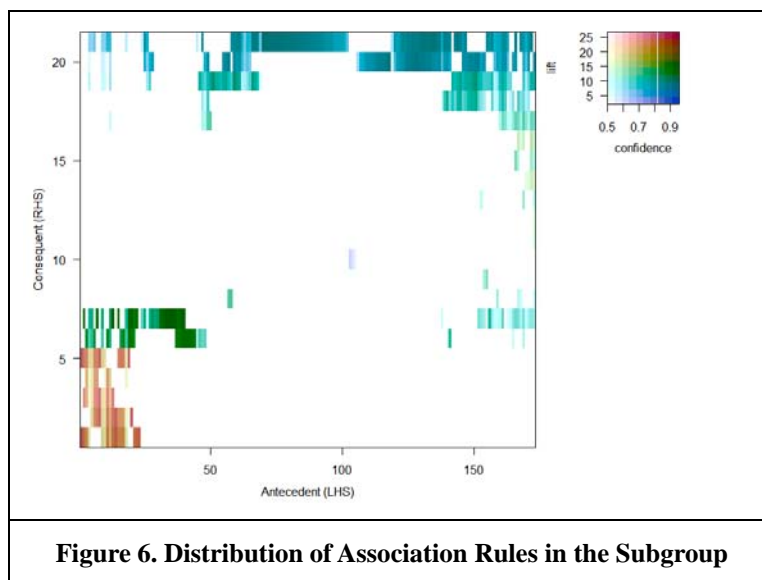**Figure 5. Network of 20 Rules (see also Table 2)**

The fact that we investigate followers of a brand Twitter does not guarantee that people are likely to distribute messages for the company. The relatively small number of users in our data dedicates to deliver the messages from the Shinsegae Department Store (1.14 % as shown in Table 3). 82 percent of users did not perform an information relay role for the company.

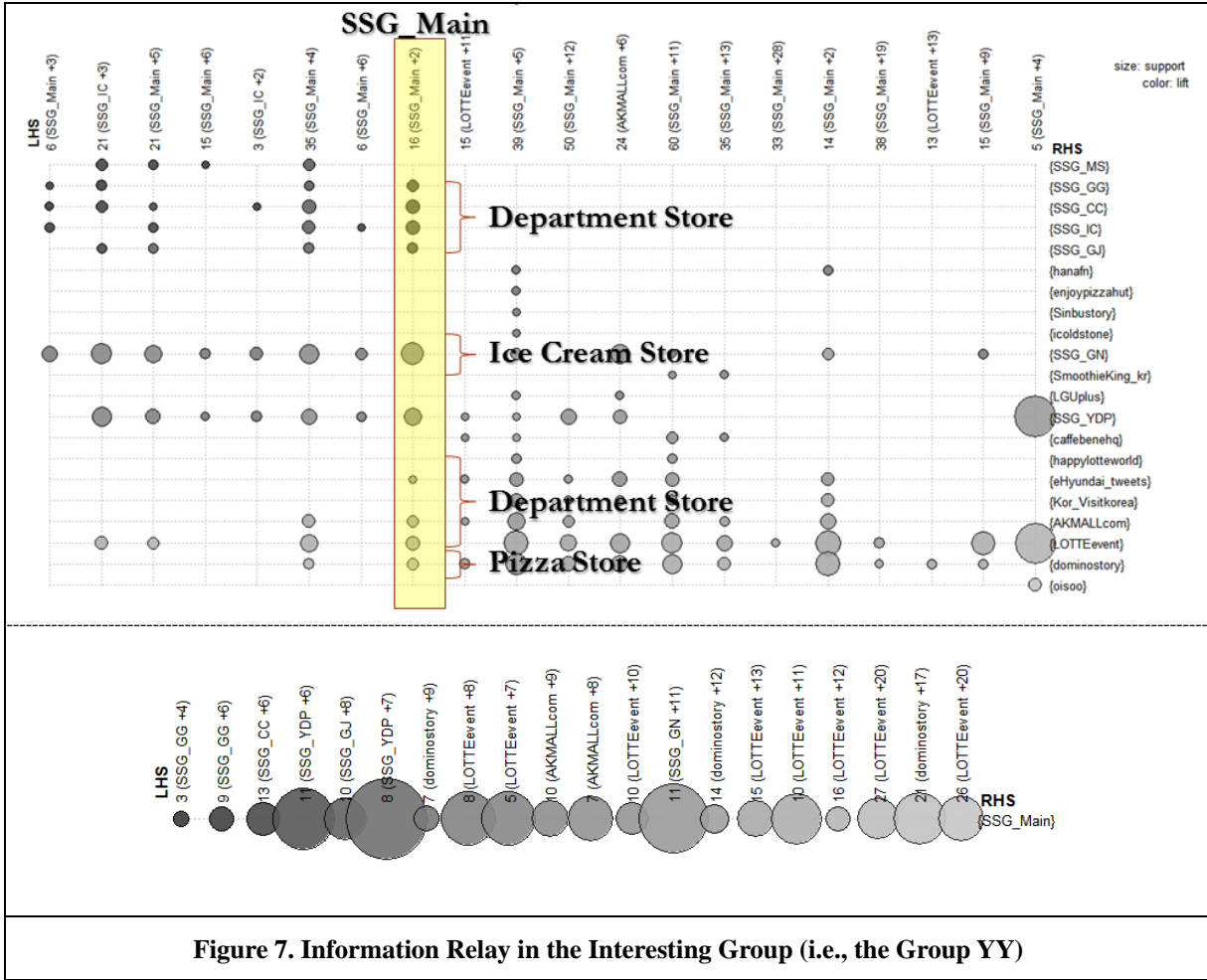| Table 3. Cross-Table by Targets of Retweet Messages		
	SSG Main Retweet: No	**SSG Main Retweet: Yes**
Retweet but SSG Main: No	Nobody	207 (1.14%)

Retweet but SSG Main: Yes	14,941 (82.00%)	3,072 (16.86%)

* The number of Twitter users in our data.

* SSG Main refers to the Shinsegae department store.

* Since the data contained only retweeted messages, there are no subjects for the first element of the matrix above.

We analyzed a subgroup of total users in data to discover useful association rules of retweets. If a user did retweet the messages from the Shinsegae Department Store, did his or her other retweet messages include relevant topics or not? In order to investigate the question, we focused on 3,072 retweet messages (Group YY for convenience) that included both of the Shinsegae Department Store and others.

Figure 6 shows the distribution of association rules in the Group YY. We discovered that there was a strong cohesion in terms of confidence and lift value. Moreover, diverse antecedents (LHS) were found compared to a few number of consequent (RHS).

Figure 6. Distribution of Association Rules in the Subgroup

In Figure 7, the grid representation of association rules in groups is presented. Based on the profile of the target users of retweet messages, we discovered that the users of the Group YY focused on homogenous brand Twitter sites. As shown in Figure 7, a user who has retweet messages from the Shinsegae Department Store (SSG Main) has a tendency to conduct retweeting of other branches of the Shinsegae Department Store. Moreover, the user is likely to select other competitors of the department store.

Figure 7. Information Relay in the Interesting Group (i.e., the Group YY)

To understand in detail the result of Figure 7, we conducted an additional analysis using a natural language processor. We adopted a collocation algorithm suggested by Manning and Schütze (1999) to obtain the collocation keyword pairs. Out of the 423,973 keyword pairs, we discovered that the word, "gift" is the most powerful element. Table 4 shows collocation frequencies of the keyword pairs from 1 to 20 in ranking. As shown in Table 4, Twitter users relayed information on gifts in association with searching (43 percent), announcing (29 percent) and acquiring activities (28 percent).

Table 4. Collocation of Keyword Pairs (Top 20)				
Keyword Pair	Frequency	Search	Announcement	Acquisition
gift-twitter	654	T		
gift-homepage	823	T		
gift-"department store"	913	T		
gift-"how to"	1136			T
gift-fortune	1144			T
gift-customer	1286		T	
gift-"twitter friend"	1289		T	

gift-follower	1304	T		
gift-automatic	1325	T		
gift-event	1604	T		
gift-iPad	1633	T		
gift-tax	1648			T
gift-apply	1996			T
gift-cost	2048			T
gift-lottery	2107	T		
gift-when	2659		T	
gift-show	2928		T	
gift-winner	3067		T	
gift-tweets	3091	T		
gift-announcement	3641		T	

Discussion and Conclusion

Contribution

Social network services provide the opportunity to observe the customers' communication directly. That is, there is less of a need to conduct separate marketing research in order to find out whether customers are interested in companies' products or services, or to find out why they are dissatisfied. In addition, it is possible to know which marketing promotion messages that customers are more interested in, and which ones they prioritize. Just like we strengthen our ties in society while delivering interesting news or other information that are resourceful to our neighbors, customers continue to confirm their relationships while relaying information via SNS. This type of trend raises the need for the companies to take an interest in the customers' information relay and to use it strategically.

Our research demonstrates that the share of retweet increases during the daytime while it tended to decrease increasingly as the night time would arrive when it comes to the retweet's time distribution. However, the frequency increases once again during the night time when people rest, and the frequency decreases considerably when the time to sleep arrives. The fact that the retweet distribution is in line with the cycle of people's activities demonstrates that the retweet activities consolidated their position as one of the everyday communication activities. This is very different from the planned activity in which one tries to acquire and process information at specific time to use the information for a specific purpose.

If Shinsegae Department Store is retweeted, there was higher probability that the tweet of other department stores, shopping malls or pizza companies' events would be retweeted, which demonstrates that the users play the role of relaying the message of the brand, Twitter pertaining to a specific topic. This is like the users disseminating marketing promotion messages on their social network just like Shinsegae Department Store. Goldsmith and Horowitz (2006) claims that the users voluntarily acquire the information of the products and services that they are interested in while online. The result of this research demonstrates that the customers go even further. Instead of merely acquiring information, they voluntarily play the role of spreading information on the SNS. What is even more important is that this manifests a consistent and systematic pattern. Users may merely show contingent interest on the message that encompasses simple fact. If so, however, no rule would have been found when it comes to the target of retweet. However, this research demonstrates that the specific users who are following department stores, actively relay the tweet message of other brands that are related to the department stores. This proves that the act of the users who spread messages is not contingent by any means.

Jansen et al. (2009)'s investigative study proves the influence of the brand, Twitter. This research supports and expands on this result. Instead of merely confirming the influence of the brand Twitter, this research discloses that the supporters who back up this influence are the followers. Twitter can connect many people only after requiring very simple procedure. Moreover, there are not many instances in which they need special permission during the connection process. Due to this characteristic, working level marketers are also well aware of the fact that Twitter can be used as an effective tool for transmitting messages just like mass communication media (Hartzel et al. 2011). However, the question is whether a message sent for the first time can be transmitted continually. If information continues to be spread like word of mouth, then this would produce a result that is greater than the intended.

On the SNS, it is necessary to form social ties with customers before companies can engage in promotional activities, which in turn incurs the cost of acquiring customers. Accordingly, it would be difficult to realize the economy of scale on the SNS if messages are delivered using merely the network formed with customers initially. At this time, the scope of message distribution increases if customers voluntarily re-send messages. This research demonstrates the possibility of finding such customers who actively play this type of role on the social network. This result is an expansion of the investigative study conducted by Hartzel et al. (2011), and raises the need to effectively find and to manage this group of customers going forth.

Limitation and Future Research

Our study can be expanded on and complemented continually. First, we used only the retweet data of the specific companies' followers. This provided the framework with which the significance of data could be understood clearly when interpreting data. However, it is necessary to factor in the characteristics of industries and users in order to reach a more general conclusion. Besides the companies in the service industries such as the department stores, this research could be expanded to include manufacturing industries such as automobile and IT device manufacturing industries in order to collect data from them as well or this research could have studied the cultural background of the users to cover areas besides Asia.

Second, we did not factor in the qualitative characteristics of the retweet messages. An understanding of which message contributes to the spread of brand's retweet messages will help to discover the customers who participate in the information relay. Moreover, this data can be secured as the weighted data needed for activating information relay activities. By applying the natural language processing and text mining method, it would be possible to discern out the characteristics of the information relay group to discover and to manage the users who contribute to certain companies or competitors.

References

Agrawal, R., Imieliński, T., and Swami, A. 1993. "Mining Association Rules between Sets of Items in Large Databases," Proceedings of the 1993 ACM SIGMOD International Conference on Management of Data - SIGMOD '93, New York, pp. 207-216.

Agrawal, R., and Srikant, R. 1994. "Fast Algorithms for Mining Association Rules," in Proceeding 20th International Conference on Very Large Databases, Vldb, J.B. Bocca, M. Jarke and C. Zaniolo (eds.). CA: Morgan Kaufmann, pp. 487-499.

Armentano, M.G., Godoy, D., and Amandi, A. 2011. "Towards a Followee Recommender System for Information Seeking Users in Twitter," Proceedings of the Workshop on Semantic Adaptive Social Web (SASWeb 2011), Girona, Spain, July 11-15, 2011, pp. 27-38.

Bem, D.J. 1972. "Self Perception Theory," in Advances in Experimental Psychology, L. Berkowitz (ed.). NY: Academic Press, pp. 1-62.

Boyd, D.M. 2008. "Taken out of Context: American Teen Sociality in Networked Publics." University of California-Berkeley, pp. 1-409.

Boyd, D.M., Golder, S., and Lotan, G. 2010. "Tweet, Tweet, Retweet: Conversational Aspects of Retweeting on Twitter," Proceedings of HICSS' 10, pp. 1-10.

Chen, J., Nairn, R., Nelson, L., Bernstein, M., and Chi, E.H. 2010. "Short and Tweet: Experiments on Recommending Content from Information Streams," Proceedings of CHI'2010, Atlanta, GA, pp. 1185-1194.

Davis, A., and Khazanchi, D. 2008. "An Empirical Study of Online Word of Mouth as a Predicator for Multi-Product Category E-Commerce Sales," Electronic Markets (18:2), pp. 130-141.

Fournier, S. 1998. "Consumers and Their Brands: Developing Relationship Theory in Consumer Research," Journal of Consumer Research (24:4), pp. 343-353.

Goldsmith, R.E., and Horowitz, D. 2006. "Measuring Motivations for Online Opinion Seeking," Journal of Interactive Advertising (6:2), p. http://www.jiad.org/article76

Hahsler, M., and Chelluboina, S. 2012. "Arulesviz: Arulesviz - Visualizing Association Rules and Frequent Itemsets," R Package (Ver. 0.1-5).

Hahsler, M., Gruen, B., and Hornik, K. 2011. "Arules: Mining Association Rules and Frequent Itemsets," R Package (Ver. 1.0-8.).

Hartzel, K.S., Mahanes, C.J., Maurer, G.J., Sheldon, J., Trunick, C., and Wilson, S.J. 2011. "Corporate Posts and Tweets: Brand Control in Web 2.0," Journal of Information & Knowledge Management (10:1), pp. 51-58.

Helm, S. 2000. "Viral Marketing - Establishing Customer Relationship by "Word-of-Mouse"," Electronic Markets (10:3), pp. 158-161.

Henning-Thurau, T., Gwinner, K.P., Walsh, G., and Gremle, D.D. 2004. "Electronic Word-of-Mouth Via Consumer-Opinion Platforms: What Motivates Consumers to Articulate Themselves on the Internet?," Journal of Interactive Marketing (18:1), pp. 38-52.

Jansen, B.J., Sobel, K., and Chowdury, A. 2009. "Twitter Power: Tweets as Electronic Word of Mouth," Journal of the American Society for Information Science and Technology (60:11), pp. 2169-2188.

Java, A., Song, X., Finin, T., and Tseng, B. 2007. "Why We Twitter: Understanding Microblogging Usage and Communities," WebKDD/SNA-KDD '07, New York, pp. 56-65.

Kwak, H., Lee, C., Park, H., and Moon, S. 2010. "What Is Twitter, a Social Network or a News Media?" Proceeding WWW '10 Proceedings of the 19th International Conference on World Wide Web, New York, pp. 591-600.

Manning, C.D., and Schütze, H. 1999. Foundations of Statistical Natural Language Processing. MA: The MIT Press.

McPherson, J.M., and Smith-Lovin, L. 1987. "Homophily in Voluntary Organizations: Status, Distance and the Composition of Face-to-Face Groups," American Sociology Review (52:3), pp. 370-379.

Oh, O., Kwon, K.H., and Rao, H.R. 2010. "An Exploration of Social Media in Extreme Events: Rumor Theory and Twitter During the Haiti Earthquake 2010," ICIS 2010 Proceedings, Paper 231. http://aisel.aisnet.org/icis2010_submissions/2231.

Palmer, A.J. 1996. "Integrating Brand Development and Relationship Marketing," Journal of Retailing and Consumer Services (3:4), pp. 251-257.

Pfeffer, J. 1982. Organizations and Organization Theory. Boston: Pitman.

Piskorski, M. 2011. "Social Strategies That Works," Harvard Business Review (89:11), pp. 116-122.

R, C.T. 2012. R: A Language and Environment for Statistical Computing, R Foundation for Statistical Computing. Vienna, Austria: ISBN 3-900051-07-0, URL http://www.R-project.org/

Richins, M.L., and Root-Shaffer, T. 1988. "The Role of Involvement and Opinion Leadership in Consumer Word-of-Mouth: An Implicit Model Made Explicit," Advances in Consumer Research (15), pp. 32-36.

Salancik, G.R., and Pfeffer, J. 1977. "An Examination of Need Satisfaction Models of Job Attitudes," Administrative Science Quarterly (22:3), pp. 427-456.

Schacter, S. 1959. The Psychology of Affiliation: Experimental Studies of the Source of Gregariousness. CA: Stanford University Press.

Smith, A.N., Fischer, E., and Yongjian, C. 2012. "How Does Brand-Related User-Generated Content Differ across Youtube, Facebook, and Twitter?," Journal of Interactive Marketing (doi: 10.1016/j.intmar.2012.01.002).

Subramani, M.R., and Rajagopalan, B. 2003. "Knowledge-Sharing and Influence in Online Social Networks Via Viral Marketing," Communications of the ACM (46:12), pp. 300-307.

Twitter. 2011. "One Hundred Million Voices." from http://blog.twitter.com/2011/09/one-hundred-million-voices.html

Weng, J., Lim, E., Jiang, J., and He, Q. 2010. "Twitterrank: Finding Topic-Senstive Influential Twitters," WSDM'10, New York, pp. 261-270.