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소셜 미디어 유형에 기반한 제품유형에 따른 정보 확산 차이

Information Diffusion Difference by Product Type Based on Social Media Type

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요 약

본 연구는 소셜 미디어 이용자들의 상호작용을 통한 제품정보 확산 패턴으로 트위터와 블로그의 특성차이에 따른 영향력을 확인해 보고자 시도되었다. 이에 각 매체에서의 제품정보에 관한 포스팅 수를 이용하여 바스모형을 통해 정보확산패턴을 확인해 보았다. 분석 결과 첫째, 블로그와 트위터 모두에서 실용재에 비해 쾌락재가 정보확산 속도가 빨랐다. 둘째, 제품유형에 관계없이 트위터는 블로그에 비해 모방효과의 영향력이 높게 나타났으며, 블로그는 트위터에 비해 혁신효과의 영향력이 높았다. 이를 통해 블로그는 트위터에 비해 이용자가 본인 스스로 직접적으로 정보를 찾는 경향이 더 높은 경향이 있으며, 트위터는 블로그에 비해 혁신에 대한 주관적 평가보다는 다른 사람으로의 전달된 평가에 더 의존하는 경향이 있음을 시사한다.

키워드 : 트위터, 블로그, 제품유형, 바스모델, 정보확산

Ⅰ. Introduction

Social media is used by consumers who are interested in learning about products, brands, people, and issues. It also provides new and diverse information and it has changed the strategies and methods of providers to communicate with consumers (Blackshaw and Nazzaro, 2006; Varnali and Toker, 2015). Appropriate media utilization can affect the consumer behavior positively because it can optimize the communication between consumers and companies (Reinold and Tropp, 2012). Therefore, it is needed to monitor and manage media activities based on consumer behaviors effectively. Currently, various social media types with diverse characteristics are appearing. It is possible to generate marketing synergy and corporate performance by using them (Evans, 2010). However, existing studies solely focused on the word of mouth effect or performance of a single media and there are only a few studies comparing the differences among different types of media. Although diverse social media carriers have common characteristics, they also have differences. Therefore, it is needed to have a marketing communication strategy understanding and using the characteristics of media with considering the characteristics of information consumers. The objectives of this study

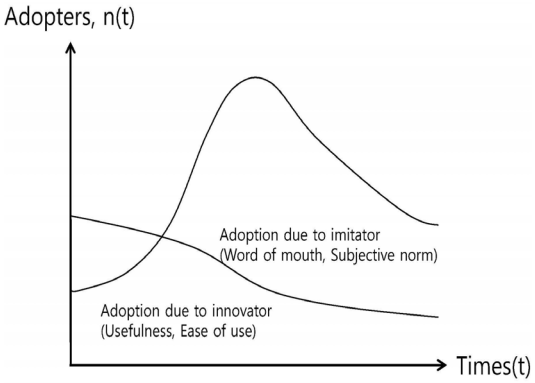
were to understand the differences in characteristics of Blog and Twitter, showing distinct differences among social media types, and compare the product information diffusion patterns. Product types can be divided into hedonic goods and utilitarian goods. Each product type has a unique product diffusion pattern so this study intended to identify the information diffusion pattern of social media users with considering the unique pattern.

Ⅱ. Literature Review and Hypothesis

2.1 Bass Model

Bass model assumed that the potential adopters of an innovation are influenced by mass media and word of mouth communication and divided the adopters of innovation into two groups. In other words, the model focused on the effects of communication channel on diffusion and divided the potential adopters of innovation into innovators, who select innovation due to external influence through mass media communication, and imitators, who select innovation due to internal influence through word of mouth communication. (Mahajan *et al*., 1991). Many researchers have proved the effectiveness of Bass mode in various fields through empirical analyses (Bass, 2004), Moreover, many studies have employed it as an explanatory model to analyze the diffusion process of a product and sales (Bass, 1969; Bass, 2004).

The Bass model includes adopters' self-perception, the innovation effect from product utility, and the imitation effect generated from the interactions between early adopters and potential adopters. In the cumulative curve of adoption, the innovation effect shows a convex shape but the imitation effect has a concave curve (see <Figure 1>).



〈Figure 1〉 Innovation and Imitation Effect (Mahajan *et al*., 2000)

This study chose Bass model as an analytical model in order to measure the diffusion of production information in social media, which is a new type of media and contains the characteristics of popular media and word of mouth media. Bass model is a mixed effect model that takes into account both the external influence of the mass media and the internal influence of the word of mouth in the diffusion of innovation. The merit of the model is that it can clearly explain the two effects through a simple model. In this sense, we would like to evaluate the effects of social media, a communication channel, on the diffusion of product information by dividing it into mass media effects and word of mouth effect.

2.2 Utilitarian and Hedonic

Product types can be divided into utilitarian goods with strong cognitive characteristics and hedonic goods with strong emotional characteristics (Shimp, 1981). Utilitarian goods are related to functional benefits, productivity, and purchase deliberation (regarding the product, service, and price features of a product prior to an actual purchase) (Ahmad, 2012; Hoffman and Novak, 1996), and hedonic goods are associated with

〈Table 1〉 Utilitarian Goods vs Hedonic

		Utilitarian	Hedonic
Product specific parameters	Type	Search	Experience
	Lifecycle	Bell-shaped curve	Rapidly declining
	Quality uncertainty	Relatively low	Relatively high
	Attributes	Objective, functional/qualitative, tangible, often mass products	Subjective, symbolic/aesthetic, intangible, scarce seasonal goods
	Seasonality	Independent	Dependent
	Diversity	Multiple versions of one product	Unique
Demand specific parameters	Consumption risk	Relatively low	Relatively high
	Consumption experience	Not multisensory	Multisensory
	Involvement	High cognitive involvement, low emotional involvement	Low cognitive involvement, high emotional involvement
	Product valuation	Rational, analytic, objective	Emotional, subjective
	Purchase motives	Rational, practical functionality, purposive solution of problems, quality	Emotional, variety-seeking, expression of individuality and subjectivity, symbolic character
	Purchase decision	Rational/cognitive choice	Holistic choice
	Type of purchase	Convenience	Impulsive
	Consumption frequency	Depends on product	Limited

* Source: Clement *et al.* (2010).

experiential, enjoyable, and appreciation of the experience rather than simply for task completion (Ahmad, 2012; Babin *et al.*, 1994). The attributes by product type were compared based on existing literature (see <Table 1>).

This product type classification has been widely used by researchers to measure how to measure the certainty of product information, minimize the risk, draw high customer loyalty, and maximize the information quality (Mitra *et al.*, 1999). Product classification is an important research topic in studying the consumer behavior because the consumer behavior changes by product type (Bei *et al.*, 2004).

As information search on the web has become common, the study has been expanded to cover the consumer behavior on the web by product type.

Acquisition of information on the web generally helps consumers increase perceived benefits and reduce search costs when making decisions. However, it is harder to gather the information of experience goods (hedonic goods) than that of search goods (utilitarian goods) in the real life. Therefore, people use online information more for experience goods and it has higher perceived benefits (Bei *et al.*, 2004; Rha, 2002). Recent studies evaluate the number of users by product type in Twitter, a type of social media. The results of these studies showed that there were a lot more hedonic goods users such as songs and movies than utilitarian goods users such as smartphones and laptops. Moreover, results from the information source by product type revealed that utilitarian goods such as smartphone relied on online news and IT specialty media and hedonic goods such as songs and movies had more informer activities in the social media and com-

munity (Baek and Kim, 2017). Utilitarian goods mainly advertise beneficial information to promote the difference among products, while hedonic goods require signals reducing uncertainties associated with products because hedonic goods have more uncertain characteristics than utilitarian goods. It relies on a mechanism providing indirect information about the quality (Chu and Chu, 1994; Grossman, 1981; Nelson, 1974; Wolinsky, 1983). The preview of movies and the sample clips of music are good examples. They are mainly used to advertise products to customers and aim for word of mouth when a product is about to be released. Most of the information is spread through the medium that can satisfy the characteristics of the product well and this medium can spread the information to another medium in a chain.

The influence of word of mouth can differ by product type. Park and Lee (2009) found that the difference between negative and positive word of mouth on web sites was greater in experience goods (hedonic goods) than search goods (utilitarian goods). Consumers can generally reduce uncertainty by using online word of mouth information, such as advice and tips from an expert before purchasing hedonic goods. Mudambi and Schuff (2010) showed that consumers who had positive initial perceptions to hedonic goods, such as music CDs, might agree with very positive reviews but extreme review scores may not help the purchase decision process of consumers. Reviews with extreme scores can cause disputes with consumers' initial perceptions without added extra merit in the decision-making process. Since reviews are based on the subjective experience of consumers, they are multi-sensory, and they cannot be verified before actual experience, it is difficult to trust only text based reviews (Clement *et al.*, 2006). Moreover, consumers may give a different response because it is based on diverse senses. On the other hand, extreme scores of utilitarian goods' reviews help people make decisions because these reviews compare with other goods and include important information regarding how to use the product. The results implied that reviews with objective attributes were more useful than those with sensory and subject attributes.

The results of previous studies revealed that the word of mouth about a new product gained from the experience of the initial product, whether it was positive or negative emotion, became the evaluation standard. However, the evaluation after using a product multiple times was not a significant predictor. It was believed that this pattern could vary by the attributes of a product.

The information of utilitarian goods may spread by the influence of emotions even before purchasing a product through online informers when the information exposure is expanded through product function and design advertisement. However, the effects of emotion will be decreased as users have more hands-on experience and objective product review after the product is released. In the production information diffusion cycle, utilitarian goods obtain information from the social media based on emotions after the growth period is over. However, it is believed that the effects of word of mouth are not big since it is somewhat predictable through the exploration and consumers value the functional aspect of it. On the other hand, in the case of hedonic goods, the multi-sensory attributes of consumers are important and both the initial negative and positive emotions are used as predictors for evaluating the hedonic goods. Therefore, it was believed that the initial product information of innovator would promote the diffusion. When a product enters a maturity phase of the product lifecycle, the amount of diverse opinions and emotional information presented in social media can be used to predict actual sales.

In the product cycle, the initial emotions of utilitarian goods affected the information diffusion but the clue effects of emotions diminished with time. On the other hand, multi-sensory clues during the product release as well as initial stage help people measure hedonic goods and the diffusion period is short. Therefore, it was determined that hedonic goods would have higher innovation effects than utilitarian goods. Moreover, it was believed that the imitation effects through word of mouth by late adopters would be higher with hedonic goods than utilitarian goods. From these speculations, following hypotheses were established.

H1: Product differences between hedonic and utilitarian have an effect on the diffusion of product information in social media. Specifically hedonic products are strong both innovation effect and imitation effect.

2.3 Blog and Twitter

Social media can express information more diversely than the traditional media owing to its structural form having a comment, image, video, search, and bulletin board. Blogs can be more advantageous than Twitter because it can write about things freely and post pictures and videos in order to reduce the uncertainty of the product information. Moreover, it can increase the user satisfaction by using various contents and decreasing the uncertainty of a product (Hwang *et al*., 2014).

A blog has a media characteristic that an individual becomes a subject to freely share his or her story about the latest news or his or her interests and hobbies and generate and distribute information (Baek and Hwang, 2014). Knowledgeable consumers independently identify and evaluate innovative products and study them in depth (Hirschman, 1980). Blogs have the ability to inform the events quickly after making independent judgments and lead the public opinion by producing new interpretations and frames (Drezner and Farrell, 2004; Matheson, 2004; Regan, 2003). It was believed that these blogs would have higher innovative influence than Twitter because blogs are based on more objective and professional attributes than Twitter.

On the other hand, it was considered that Twitter, which transmits the instant feeling with a relatively short sentence, would have high imitation influence. Twitter rather stimulates product information delivery, forms a social consensus, and shows an imitation tendency between early adopters and potential adopters than provides professional information due to the structural limitation of the 140-character limit. When a product enters a mature stage, the majority of consumers have a certain level of knowledge about the product of the provided service. Therefore, it was believed that the imitation effects through simple imitation might be larger than the innovation effects.

In other words, blogs spread information as opinion leaders with individuals' subjective thoughts. Therefore, they would be more influential than Twitter. On the other hand, as adopters are more aware of the information of products or services as time goes by, Twitter would have higher imitation effect since it is simpler and easier to spread information. the following hypotheses were set.

H2: Media differences Between Blog and Twitter have an effect on the diffusion of product information.

H2a: Innovation effects are stronger in the Blog than in the Twitter.

H2b: Imitation effects are stronger in the Twitter than in the Blog.

Ⅲ. Method

3.1 Data Collection

This study selected the smartphone as representative utilitarian goods and the song as representative hedonic goods to understand the differences in information diffusion pattern through social media by product type. Previous studies identified the song as a typical hedonic good (Lacher, 1989). An IT device is a utilitarian good (Bei *et al*., 2004). The smartphone used in this study was a product sold between 2012 and 2013. A popular song in 2012 was selected as a study subject. The quantity of each product's weekly posting was measured from the first day the name of the product appeared on the media to the day the name did not appear any longer. Data not associated with the products were identified and excluded from the analysis. This study used the Bass model.

3.2 Data Analysis

The Bass diffusion model can be represented by the following equation (1), Where N(t) is the cumulative number of adopters at time t, m is the number of potential adopters of the innovation, p is the coefficient of external influence(innovation effect), q is the coefficient of internal influence(imitation effect) and dN(t)/d(t) is the first derivative of N(t) representing the rate of diffusion at time t(Venkatraman *et al*., 1994). In the equation (1), p[m-N(t)] represents the number of innovators who is not affected by the number of people accepting the product at the time the consumer accepts the product, while (q/m)N(t) [m-N(t)] stands for the number of imitators affected by the number of people accepting the product. Innovator indicates the effects of advertising and imitator is the word-of-mouth effect.

$$\frac{dN(t)}{dt} = p[m - N(t)] + qN(t)[m - N(t)] \quad (1)$$

The NLS methodology is used to derive them. The NLS (nonlinear least squares) methodology can provide a solution of a diffusion model with more explanatory power than that estimated by the OLS (Ordinary least square) method (Venkatraman *et al*., 1994).

In this study, parameters were estimated by using the NSL estimation procedure, which has the highest estimation accuracy (Srinivasan and Mason, 1986).

The number of posts on social media by product type was evaluated and the diffusion pattern over time was examined. The number of postings by product type in Blog and Twitter are shown in <Table 2>. The cumulative graph by date is shown in <Appendix 1>.

〈Table 2〉 The Number of Social Media Postings on Smartphone and Song

	Smartphone			Song		
	GS3	GS4	i5S	TLD	SLU	PGS
Twitter	309,594	239,566	145,913	4,153	9,483	61,825
Blog	102,463	76,329	61,909	3,327	1,537	18,321
Total	412,057	315,895	207,822	7,480	11,020	80,146

Note) GS3: Galaxy S3, GS4: Galaxy S4, i5S: iphone 5S, TLD: T-ara LoveyDovey, SLU: sister Loving U, PGS: Psy Gangnam Style.

Ⅳ. Results

The diffusion type and diffusion effect were calculated through the Bass model by differences of product type and social media type. F-values all models indicating model fitness were significantly ($p < 0.001$). First, a graph pattern is represented to show the suitability of the proposed Bass model with the actual data (Appendix <Figure 1>). As a result, the fitness of the actual data and the Bass model was the highest for the practical good in Blog with showing regression coefficient ranging 0.74-0.81 (see <Table 3>). The derived results of the innovation effect (p) and imitation effect (q) to confirm the effects of product type on the information diffusion in the media is shown in <Table 2>.

When the diffusion coefficients of the smartphone and the song were compared, the innovation effect (p) and imitation effect (q) of the song were higher than those of the smartphone. When the innovation effect (p) of Blog and Twitter was compared, that of Blog was higher than that of Twitter. The imitation effect (q) of Twitter was higher than that of Blog. Therefore, the both hypotheses 1 and 2 were accepted.

〈Table 3〉 NLS Specifications for Each Media

Hedonic	Twitter			Blog		
	TLD	SLU	PGS	TLD	SLU	PGS
Parameter Estimation						
m	4,150	9,480	6,180	3,320	1,530	1,830
p	0.00546	0.042	0.0219	0.00956	0.0866	0.0415
q	0.2668	1.0391	0.2387	0.2219	0.0486	0.0843
Model fit						
F value	43.38***	97.94***	121.81***	81.54***	125.21***	348.14***
R^2	0.44	0.69	0.744	0.6	0.74	0.892
Hypothesis testing						
Null statistic	a = 0	a = 0	a = 0	a = 0	a = 0	a = 0
Test statistic	7.03***	13.77***	7.93***	6.12***	14.16***	6.68***
Utilitarian	GS3	GS4	i5S	GS3	GS4	i5S
Parameter Estimation						
m	3,090	2,390	1,450	1,020	7,570	1,450
p	0.000001716	0.00000404	0.00000001418	0.00508	0.00127	0.0000002853
q	0.1429	0.1595	0.1251	0.0475	0.038	0.086
Model fit						
F value	268.9***	54.1***	110.8***	291.03***	181.58***	174***
R^2	0.798	0.52	0.64	0.812	0.78	0.74
Hypothesis testing						
Null statistic	a = 0	a = 0	a = 0	a = 0	a = 0	a = 0
Test statistic	7.95***	4.08***	6.07***	3.29***	3.64***	3.84***

Note) GS3: Galaxy S3, GS4: Galaxy S4, i5S: iphone 5S, TLD: T-ara LoveyDovey, SLU: sister Loving U, PGS: Psy Gangnam Style.
*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Ⅴ. Discussion

Communication channels are an important variable affecting the adoption of innovation in the diffusion of innovations such as new technologies and new products. The importance of social media as a communication channel is becoming more important. Companies are using social media as a strategy to communicate with consumers because it is cheap and has the real-time marketing effects. Recently, they utilize various media with considering the characteristics of them since many social media services have emerged. Therefore, it is necessary to understand the difference among these services and consider the attitude of consumers in order to utilize social media services with different characteristics in marketing strategy. This study aimed to find out the difference in the influence of information diffusion by product type based on blog and Twitter media, which are widely used for information sharing.

First, the results of Bass model analysis showed that hedonic goods have higher innovation effects and imitation effects than utilitarian goods. It implied that hedonic goods had higher effects of innovator role and word of mouth than utilitarian goods more than the past owing to the development of social media and the benefit of users' information perception. It will contribute to the information diffusion faster as more users will use multiple media types at once instead of using one media selectively since various social media appear in the market. It is believed that it will be more influential to hedonic goods than utilitarian goods.

Secondly, the results of this study showed that innovation effect and imitation effect were important determinants of product information diffusion in social media. Twitter had higher imitation value q than Blog and Blog had higher innovation value p than Twitter. The innovation effect value p means self-perception and self-interest through direct personal experiences, such as the ease of use and usefulness (Lee *et al*., 2013). In other words, it has the characteristics of increasing the adopter at the initial diffusion stage by using the tendency of searching information independently from direct and formal sources from blogs. Personal characteristics of Blog can increase the innovation effect. The imitation effect value q reflected social influence, such as subjective norm and word-of-mouth (Karahanna and Straub, 1999). The results showed that Twitter had more word of mouth effects than blogs. Moreover, the diffusion is driven by imitation coefficient in general diffusion process. Twitter had a good synchronicity effect and high imitation effect because of its short sentence structure, rapid transmission power, and links with many people. In the case of Blog, an individual writes on an issue, which the individual is interested in, to share the information. It can diffuse information through people with strong innovation tendency because it is written with an interest in specific information. In other words, Twitter was a medium that maximized interpersonal communication and it had high word of mouth effects. On the other hand, blogs revealed high innovation effects by maximizing the advertisement effects with mass media.

This study, unlike previous studies, clearly showed the differences in product information diffusion pattern of Blog and Twitter by using actual data on the web and the bass model. Following academic and practical implications were gained by analyzing the effects of new communication channels such as social media on the product diffusion.

The innovation diffusion theory has triggered considerable research in consumer behavior, marketing manager, and management and marketing science fields. The studies in the consumer behavior field became the key to evaluate the applicability of developed

hypotheses (Gatignon *et al*., 1989). This study evaluated the suitability of Bass model to develop a marketing strategy for a product targeting potential adopters in different social media and to predict and explain the information innovation diffusion of a new product in social media.

In the social level, it will be possible to find the implications of using social media as a marketing channel based on the results of this study. In other words, when social media is used as a marketing channel, it is necessary to determine what to focus on the mass media factor and the word of mouth factor because the diffusion speed owing to innovation effects and imitation effects differs by social media type. It will be important to use blogs in the initial stage of diffusion by using the innovators and opinion leaders and advertise the usefulness of new technologies and new products. When the product is well received by consumers, it will be effective to actively use the word of mouth through Twitter such as users' comments and product reviews. In other words, it will be necessary to utilize social media effectively and strategically as a marketing channel according to PR strategy. The results of this study implied that it would be crucial to understanding the importance of social media system structure for establishing marketing strategies timely and successfully in the age that diverse media coexist and people use them together interchangeably.

However, this study has following limitations. First, I have examined the production information diffusion pattern on Blog and Twitter, but it will be necessary to check the diffusion patterns on other social media in the future. Because social media is a part of modern life, it can be used as a more appropriate contact medium if we understand users' social media usage behavior and companies' usage behavior. Secondly, this study evaluated famous items representing product types but the information diffusion pattern of a non-popular product may be different from the identified pattern. Therefore, it will be necessary to analyze additional product types. Futures studies will need to be extended in consideration of this.

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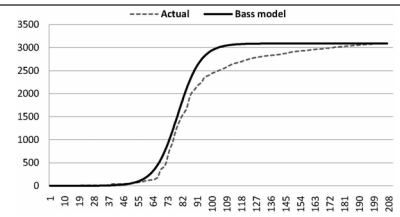
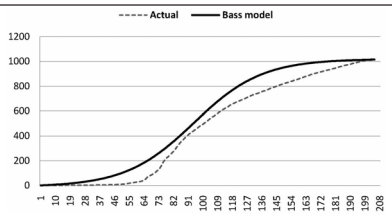
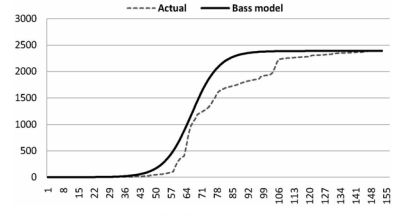
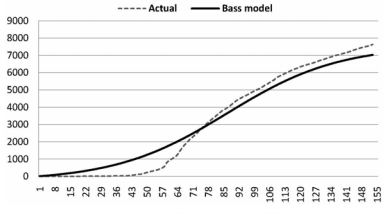
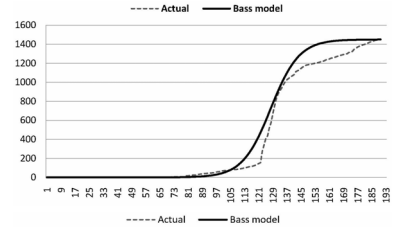
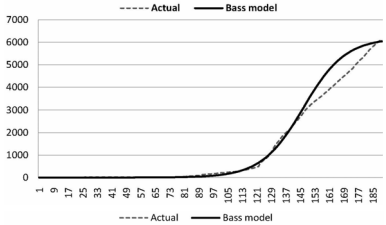
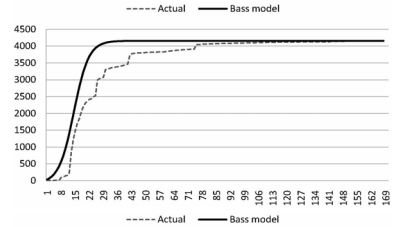
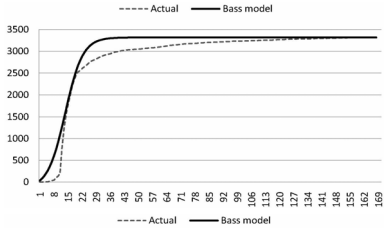
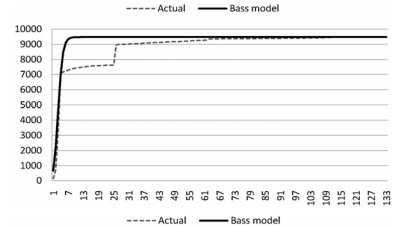
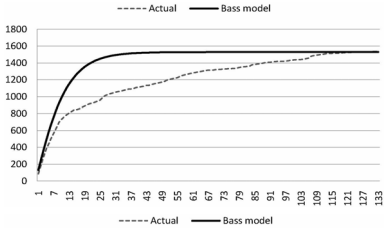
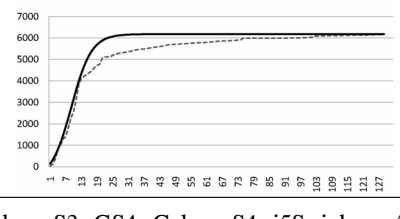
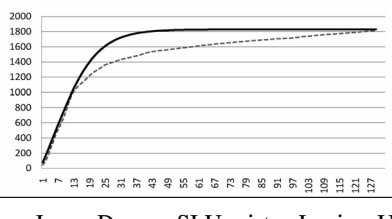
〈Appendix〉

	Twitter	Blog
GS3		
GS4		
i5S		
TLD		
SLU		
PGS		

Note) GS3: Galaxy S3, GS4: Galaxy S4, i5S: iphone 5S, TLD: T-ara LoveyDovey, SLU: sister Loving U, PGS: Psy Gangnam Style.

〈Figure 1〉 Bass Fitted Model

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Information Diffusion Difference by Product Type Based on Social Media Type

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Abstract

This study aims to understand the differences in the media characteristics of two types of media, namely, Blog and Twitter, as well as in their factors that affect product information diffusion. To achieve these objectives, the information diffusion pattern is identified by analyzing the number of product-related posts in each media based on the Bass model. The analysis results revealed that the information diffusion speed of hedonic goods was faster than that of utilitarian goods. Regardless of product type, Twitter had a higher imitation effect than Blog, while Blog had a higher innovation effect than Twitter. The results implied that users of Blog tended to find information by themselves while those of Twitter relied more on the others' evaluation than their own subjective evaluations of innovations.

Keywords: Twitter, Blog, Product Type, Bass Model, Information Diffusion

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서강대학교 경영전문대학원에서 경영정보시스템전공 박사학위, 대구가톨릭대학교 경영학 석사학위, 그리고 대구가톨릭대학교 경영학 학사를 취득하였다. 현재 관심분야는 소셜 미디어, 정보 확산, 전자상거래 등이다.

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