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Abstract

Silent Members (SM) on the net tend to be considered those who do not generate any value compared with Active Members (AM). However, the realty is opposite; SM play a major role in turning information into commercial value (purchase). Our survey of a site that evaluates cosmetic products lead to the conclusion that SM's contribution (when measured in aggregate) in spreading information and influencing purchases is twice as much as those of AM even with a conservative estimate. It is assumed that AM, who have strong ties with the network, and SM, who convey the evaluation information to outsiders, have different roles respectively.

Keywords

E-network, Silent Member, lurker, spreading information, purchase, commercial value, evaluation information

1. Overview

How much commercial value (purchases by consumers) does the consumer generated evaluation information on web sites create?

Based on this question, research was carried out on @cosme, a web site which specializes in accumulating user evaluation on cosmetic products, and found that the information provided

stimulates consumers' purchasing activities. In particular, Silent Members (SM: people who have never posted any message at the site over a period of time) influence the purchasing activities of others greatly by relaying to the outside the information offered by Active Members (AM: people that have posted messages over a period of time) on the site. The notions of SM and AM are conceptually identical to Ikeda(1997), Kaneko(1997), and Kuramochi(2000)'s ROM (read only members) and RAM (radical access members), except for some differences in the operational definitions of time periods. Nonnecke and Preece (2000, 2001) call an SM a lurker (or a silent participant).

Preceding works on SM demonstrate that e-networks have a considerable influence on AM's communication behavior. Our research covered *purchasing activities* in addition to communication activities. We targeted not only the primary purchases by SM and AM who have direct access to the information, but also the secondary purchases of people who received the information from SM and AM. We placed a particular emphasis on uncovering the behavior of SM which has not been a target of research in spite of the awareness that it is the majority on e-networks. (Kaneko 1997, Kuramochi 2000)

Our research clarified the commercial value (purchases by consumer) generated by evaluation information on the Internet. Those enterprises who are seeking new relationships with consumers would find this study quite useful for making marketing strategies utilizing evaluation sites on the Internet. (Shimaguchi 1997)

To begin the research, the cited works were examined and research questions were formulated. After the survey, a report was made based on the collected data.

Corroborative evidence was made through a strictly statistical approach. At the same time, estimating process was included to extract findings from typical examples. Please note that this is not a hypothesis-verification type of report for this reason.

2. Examining the Literature of the Preceding Study

Long before the age of the Internet, evaluation information had been spread through human communication, and was studied in the annals of social psychology and in marketing as one form of media which influences the society at large and the consumer behavior in particular.

Social psychologist studied 'rumor' as a form by which social information is disseminated. Kawakami (1997) differentiated 'word of mouth' from 'rumor' and stated, "word of mouth is a mouth to mouth communication, as a procedure to convey the evaluation information on the service level of a shop or reputation of a company."

In marketing theory, being conscious of confrontation between enterprise and consumer, word of mouth was regarded as an uncontrollable factor (C), unlike the controllable mass communication, among the information sources of consumers. (Okumura & Ikeo 1991, Figure IV-8) (Figure 1) These studies were carried out as it was proved that word of mouth does influence consumers' purchasing behavior. A model was presented by Shimizu (1999), which included the existing comprehensive decision making model. Within the four stages of the decision making process of an individual; recognition of needs, processing information, making attitude, and selecting (purchase), evaluation information influences purchasing as outside information searched for during the processing information stage.

	Human Factor	**Non-human Factor**
Directly Controllable Factors for Enterprises	[A]Salesperson	[B]Mass Communication, Product, Price
	Retailer	
Uncontrollable Factors For Enterprises	[C]Family Friends Members of other group	[D]Articles in Newspapers or Magazines, Product Test by the Third Party

Figure 1. Consumer's Sources of Information

After the Internet became widely used, exchange of evaluation information became very active. The evaluation information on the Internet was the fruit of interaction between consumers, which as a phenomenon influences the sales of products and clients' satisfaction as a direct result of said interaction. Interaction itself changed the role of consumers; no longer were they only individuals who consume goods and services (Kokuryo 1999), but evaluation information on the Internet could be utilized when constructing a new relationship between 'consumers who produce value' and 'enterprises'.

Now let us examine the effect of evaluation information on the basis of human communication research. Hamaoka (1993) considered the effect of personal communication, thus, "Influence of word of mouth on decision making to purchase is greater when commitment was deeper and uncertainty is higher, a consumer's decision making process was influenced by society, and it influences the consumer's behavior even when no direct communication was made between consumers". The evaluation information on networks is one way to communicate and can not specify the provider of information, as it is not mouth-to-mouth, in real time communication. However, despite the fact that the communication is indirect and the information is offered from unknown individuals, the huge quantity of information on the Internet can be considered public opinion and influences consumers' decision making. As a web site is a medium to which consumers must spontaneously access themselves, it is presumed that the evaluation information is referred to at the last stage of the decision making process and likely to affect the users greatly.

3. Research Questions

We categorize purchase triggered by evaluation information on the net into 1) primary purchases and 2) secondary purchases. Primary purchases are made by the site members (both SM and AM), based on the information offered by AM. Secondary purchases are made by non-members when SM/AM spreads information to the outside. Figure 2 shows how the commercial value (purchase), the sum of the primary purchase and the secondary purchase, is generated from the evaluation information on the Internet.
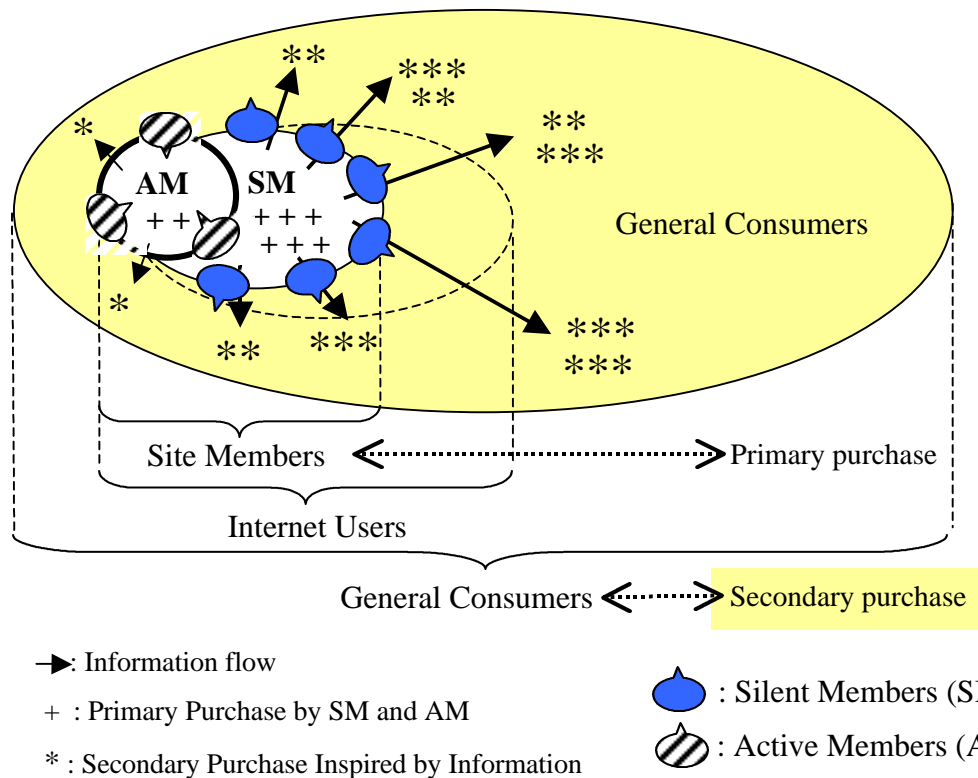
Figure 2. Commercial Value (Purchase by Consumers) generated form Evaluation Information on the Internet

To verify this model, research questions (RQ) were introduced.

Applying The Spiral of Silence Theory (Noelle & Noumann 1989) regarding formative process of public opinion, the more evaluation information offered on the Internet, the bigger the influence becomes as a leading opinion to readers, exceeding word of mouth information in number. Therefore the following RQ is introduced.

[RQ1-1] Both SM and AM are strongly influenced by the evaluation information on the Internet when they make the decision to buy a product. Is this influence greater than that of word of mouth information from friends and acquaintances?

Miyata (1998) found in her study on electronic bulletin board, "high rate of reading statements," "participation in order to exchange goods information," and "familiarity to e-meeting places" are the ruling factors in level of reference to e-meeting places. She also pointed out that the speakers, compared to SM, strongly recognize that forum is a familiar place where they could meet friends, and this fact affected the speakers to keep in touch with forum. The second RQ goes as follows.

[RQ1-2] At the primary purchase, is AM influenced more than SM by evaluation information on the Internet at their individual level?

The rate of SM on the e-network is usually higher than AM. The ratio of participants at Nifty forum in 1995 was SM:AM=56.8%:43.2%. (Kaneko and others 1997) Also, Kuramochi (2000) found that the average rate of SM was 89.9% in randomly sampled 15 mailing lists from two typical sites (egroup and freeml) in Japan. To study the influence of e-networks,

considering SM/AM in aggregate, not individual level, the role of the majority SM is presumed to be significant. As the web site, targeted in this study, gathers evaluation information and is one of the e-networks, having more SM than AM, the third RQ is introduced as follows.

[RQ1-3]   Does SM contribute to the primary purchase more than AM, regarding SM/AM in aggregate?

Regarding the spread of information change the evaluation information, an asset in the network, into a commercial value, and applying the Allen's (1979) Gate Keeper Theory, although a web site is not a organization like an research institute, a web site has a system, in which the evaluation information efficiently inspires the purchase, through the existing SM conveying information to the outside as a gate keeper.

Applying The Strength of The Weak Tie Theory (Granovetter 1973), AM who has strong tie with e-network does not have communicating function, while SM who has weak tie assumes this function. However, the evaluation information we are targeting in this study is written on consumer goods, and does not limit the consumable number like the situation-wanted information Granovetter studied, and has possibility of becoming a topic of conversation among many people. In these circumstances we can hardly think that AM does not have a communicating function. We could only say that SM may be playing a bigger role in conveying information to outsiders. Accordingly the following RQ was constructed.

[RQ2-1]   In spreading information, does SM as an individual convey more information to outsiders than AM?
[RQ2-2]   In spreading information, does SM in aggregate contribute more than AM in aggregate?

To explore how of information brought outside of the network affect secondary purchases, it is necessary to factor in the influence exercised by SM or AM. The study on the diffusion of innovation by Rogers (1982) found that opinion leaders who can affect the attitudes and apparent behavior of others exceed followers in the level of contact with mass media, participation in society, social status, and innovativeness. As the Internet is a comparatively new media, and has to be accessed actively, SM and AM who search for evaluation information on a web site are assumed to be highly innovative and aggressive in searching for information and have frequent contact with mass media. Accordingly both SM and AM are likely to have an influence on other's purchase as opinion leaders. Then is there a difference between SM and AM in the level of influence? As Miyata's (1997) study found, there is no difference in knowledge of goods between SM and AM, the information conveyed by SM and AM is considered to be the same. When the information is communicated through personal networks, the numbers of people to whom SM and AM personally approach are assumed to have no big difference. Therefore the following RQ is introduced.

[RQ3-1]   For the secondary purchase, is the influence of SM and AM the same on the purchase at their individual level?
[RQ3-2]   For the secondary purchase, regarding SM and AM (in aggregate), does SM contribute to inspire the purchase more than AM?

As the actual conditions of SM and AM regarding communication and purchasing behavior have not been fully grasped, RQ2-1 and RQ3-1 may be changed into the following RQ. And

if these questions are effective, RQ2-2 and RQ3-2 may also be changed. Through this survey we expect to find which one is the most effective.

[RQ2-1']　　In spreading information, does AM as an individual convey more information to outsiders than SM?

[RQ3-1']　　For the secondary purchase, is the influence of SM and AM different on the purchase at their individual level?

4. Research

4.1 Summary of the Survey

A study based on the Research Questions was planned on @cosme (http://www.cosme.net). The reason @cosme was chosen was because it is a successful typical example being mainly composed of the evaluation information, and it is considered to be meaningful to learn from this site. Based on the definition of Kuramochi (2000), "a member who does not dispatch any information to other members, however, invariably reads the message of AM and any speakers during a certain period of time," SM is defined as "@cosme produce members who are registered more than six months and who have not written any word of mouth information to @cosme last three months." AM as "@cosme produce members who are registered more than six months and who have written more than one word of mouth information to @cosme." The member ratio of @cosme at July 1, 2002 within the survey area was SM:AM=14,822:1,570. SM was about nine times as many as AM.

Survey Area	Tokyo, Chiba, Kanagawa, and Saitama
Gender, Age	Female, age 20 to 49
Sampling Target	List of @cosme produce members who re registered more than 6 months
Requesting Form	e-mail
Responding	Through Web
Number of Requests	3,210 (SM / AM = 2,519 / 691)
Number of Valid Answers	804 (SM / AM = 448 / 356)
Period	2002/7/11 - 2002/7/21 (The day RQ were opened on the Web ~the deadline for the targets' answer)
Notes	Sampled the same number of AM, who have written at least one piece of information to @cosme in the last 3 months, and SM who have not.
	The ratio of each members in the survey area SM:AM = 14,822:1,570 (2002/7/1)
	1,000 Yen worth remuneration for an answer

Table1. Summery of survey of cosmetic products for @cosme members

4.2 Sampling Target

@cosme is a web site mainly composed of word of mouth information on cosmetic products. The site began in December 1999, and the number of written pieces of information on more than 27,000 items was 460,000 by June 2002, the month before the survey. This site is the biggest e-community in Japan specializing in specific product information. The number of monthly page viewers is more than 16 million, the number of members is 140,000 (including i-mode members), the number of site visitors is 300,000 per month, and the number of mail magazine registrants is 53,000. The core users of @cosme are working women in their twenties and thirties. Users' profile: 99% of users are female, 73.6% are single, and 20 and 30 year olds account for 80% of the users. 41% are office workers, 14% students, 11% housewives, 10% part time workers, and 24% have other occupations.

Figure 3. Top page and information page at @cosme

4.3 Verification of Research Questions

Now let us turn to verifying the Research Questions regarding the primary purchase. The positive answers to the question, "Have you purchased any cosmetics based on the information you read at @cosme?" was 92.4% totaling the answers, "more than 4 times," "2 or 3 times," and "once." Therefore the word of mouth information written at @cosme is greatly influencing the purchasing of @cosme members.

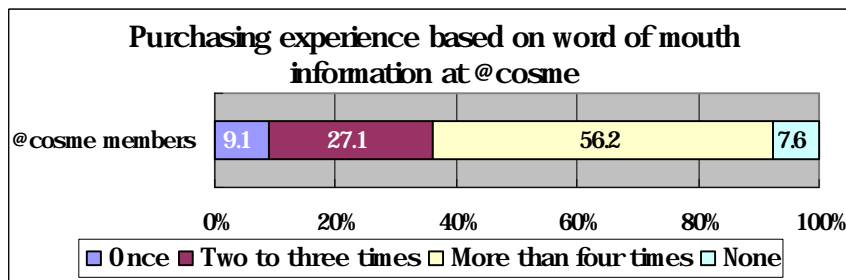*Figure 4. Research on the primary purchase*

The next question was asked at each of three stages; recognition of product, understanding of product, and decision to purchase, if @cosme and/or "advice or word of mouth information from friends and acquaintances" was helpful. The answers were chosen from five ranks, ranging from 'absolutely true' to 'totally wrong.' The positive answers, the sum of

'absolutely true'   and 'true', is shown on Table 2. At each of three stages; recognition of product, understanding of product, and decision to purchase, @cosme members are more influenced by @cosme information than the advice or word of mouth information from friends and acquaintances. The difference is statistically significant with a 1% standard. Therefore [RQ1-1] "Both SM and AM are strongly influenced by the evaluation information on the Internet when they make the decision to buy products. This influence is greater than that of word of mouth information from friends and acquaintances", is verified.

Information Source	Recognition of Product	Understanding of Product	Decision to Purchase
@cosme	41.9%	57.8%	47.3%
word of mouth information from friends and acquaintances	31.0%	30.0%	29.0%

Table 2.   Positive answer rate at the stages of recognition, understanding, and decision to buy

Moving on to the difference in purchasing behavior between SM and AM themselves, SM/AM's purchasing experience based on word of mouth information at @cosme and being identified as a member of the SM/AM groups was Independent based on the independence test and proved to be statistically significant. Therefore individual experiences of purchasing and being SM/AM makes it highly possible they are related to each other. The answers chosen from the specified five-point scale to the questions regarding whether or not word of mouth information from friends and acquaintances are helpful in making a buying decision and whether or not @cosme information is helpful in making a decision are divided into SM and AM and the averages examined for differences. The word of mouth information has no statistically significant difference between SM and AM, while information from @cosme has a statistically significant difference between SM and AM (At 99% significance level). AM is influenced greater than SM from the @cosme information when making buying decisions. Therefore [RQ1-2] "At the primary purchase, AM is influenced more than SM by evaluation information on the Internet at their individual level", is verified.

In order to verify RQ1-1 we examined the answers regarding the purchasing experience influenced by word of mouth information at @cosme. Converting the answer of 'more than 4 times' to 4 times, '2 to 3 times' to 2.5 times, and 'once' to 1 time, the number of average purchasing times is 2.5 times for SM and 3.6 for AM. By weighting these numbers with SM/AM ratio of 9 to 1, the purchasing experience in aggregate would be SM : AM = (2.5*9) / 3.60 = 6.3, and it is assumed that SM is contributing about 6.3 times as much as AM. However, one may challenge that, "SM who answered the questionnaire are people who are closest to AM, and do not represent SM in aggregate who do not usually make any remarks," as we weighted with the number of members ratio. Accordingly we need to make a conservative presumption. One of the methods is by dividing the member ratio by the ratio of valid answers to total number (SM 17.8%, AM 51.5%) that we may temper the SM/AM difference of responses to @cosme information. In this case, SM / AM = (14,822*0.178) / (1,570*0.515) = 3.26 and SM's primary purchase is presumed 2.26 times as many as AM (in aggregate), as SM : AM = (2.5*3.26) / 3.60 = 2.26. As a result, even applying the most conservative method saying that, [RQ1-3] "SM contribute to the primary purchase more than AM, regarding SM/AM in aggregate", is accepted.

Now we examine the spreading of information. The question was, "Have you ever conveyed any word of mouth information or product information on cosmetics seen at @cosme to someone, no matter which method you have taken, conversation/e-mail/writing on the @cosme/bulletin board?" The 'Yes' answer percentages are SM 74.1% and AM 93.5%, and statistical significance is approved through the test of the differences between the averages (At 99% significance level). Accordingly [RQ2-1] "In spreading information, SM as individuals convey more information to outsiders than AM", is rejected and [RQ2-1'] "In spreading information, AM as individuals convey more information to outsiders than SM", is accepted.

Although AM is superior in the information conveying experience, the number of people to whom SM and AM conveyed information are the same. For example, the number of "close friends" who were told about certain cosmetics they have tried during a "one to one conversation" were SM 2.95 and AM 3.32, and weren't significantly statistically different.

In this survey we asked if SM/AM conveyed any information on cosmetics they have tried in six different combinations of 'to whom' and 'how'. The percentage of positive answers to each combination are; "to close friend in a one to one conversation" 90.3%, "to close friend by a one to one e-mail via PC or mobile phone" 43.0%, "during a conversation with more than one friend" 72.0%, "to a number of specified people by e-mail" 5.38%, and "sending word of mouth information to @cosme" 53.8%, and "any other bulletin board of non-@cosme' was 19.1%. The popular way of spreading @cosme information, excluding writing on @cosme, is to close friends by face to face communication rather than using e-mail.

It is assumed that SM contributes about 8.2 times as much as AM, as the result of the number of members (SM 2.95, AM 3.32) who spread information to close friends by face to face conversation weighted by the member ratio of SM / AM, 9, indicated. However, if the difference of responses to @cosme information was tempered and multiplied by 3.26 as we did for [RQ1-2], the conservative presumption would be SM / AM = (2.95*3.26) / 3.32 = 2.90. Therefore, even conservatively presumed [RQ2-2] "In spreading information, SM contributes more than AM, regarding SM and AM in aggregate," is accepted

Lastly the secondary purchase should be examined. For each of the cosmetics that @cosme members themselves had tried and those which they had not tried, we asked, "Have you ever heard someone say 'I bought it,' to whom you conveyed the information?" We divided the responses to this question into SM and AM, and test their independency. The result did not prove a statistically significant difference. Consequently, purchase by those who were conveyed @cosme information and being SM or AM have no relevance regardless of the cosmetic products which were tried or not tried. In examining the question [RQ3-1] "For the secondary purchase, the influence of SM and AM on purchasing is the same at their individual level," was unable to be scientifically proved.

SM's contribution to AM in aggregate should be calculated by multiplying the positive response ratio by the member ratio, (0.713*9) / 0.74 = 8.6. The 99% confidence interval of SM's 'p' is 0.648< p < 0.763, and for AM 0.678 < p < 0.802. To add the difference in responses to @cosme information to minimum SM and maximum AM, minimum SM is multiplied by 3.26 and makes (0.648*3.26) / 0.802 = 2.63. As the secondary purchase always involves information, the number of people who conveyed information, SM 2.95 and AM 3.32 should be used to weight the above formula. Ergo, (0.648*3.26*2.95) / (0.802*3.32) =

2.34. In each case, SM's contribution is greater. Additionally the question [RQ3-2] "For the secondary purchase, regarding SM and AM (in aggregate), SM contributes to inspire the purchase more than AM," was accepted.
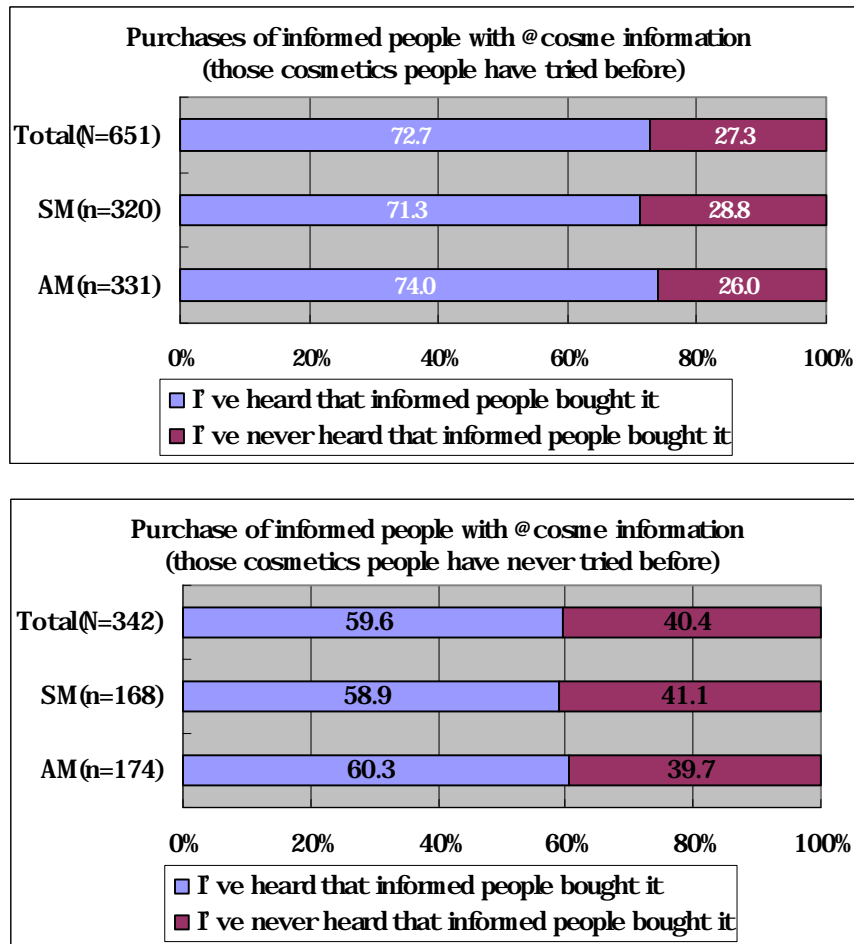

Purchases of informed people with @cosme information (those cosmetics people have tried before)

	I've heard that informed people bought it	I've never heard that informed people bought it
Total(N=651)	72.7	27.3
SM(n=320)	71.3	28.8
AM(n=331)	74.0	26.0

Purchase of informed people with @cosme information (those cosmetics people have never tried before)

	I've heard that informed people bought it	I've never heard that informed people bought it
Total(N=342)	59.6	40.4
SM(n=168)	58.9	41.1
AM(n=174)	60.3	39.7

Figure 5.   Secondary purchase

5. Conclusion; Limitation of This Study and Future Issues

The conclusion of this study is summarized as follows.

The evaluation information on cosmetic products at @cosme influences consumers more than mouth to mouth information. As a result of comparisons between SM and AM at their individual level, for the primary purchase and spreading of information, AM contributes more than SM, however, for the secondary purchase there is no difference between SM and AM. Regarding SM and AM (in aggregate), the influence of SM accounting for 90% of members is greater in spreading information and in inspiring a purchase. Even if the most conservative estimation is employed, SM in aggregate contribute 2.26 times in the primary purchase, 2.90 times in spreading information, and 2.34 times in the secondary purchase as much as AM in aggregate do. Note that 'contribution' in this study means, in "spreading information," the number of informed people, and in any "purchase" the number of purchases made.

As a result at least on @cosme, AM in aggregate who have strong ties with the network and create evaluation information and SM in aggregate who spread the information to outside sources are assumed to have different roles respectively. SM who do not write any information and just read are likely to be considered as members who do not generate any commercial value. Actually in turning the evaluation information into commercial value (a purchase), SM and AM (in aggregate) are both indispensable and complementary to each other.

We have to be prudent when attempting to generalize these findings. This study was carried out on a typical example like @cosme, yet we cannot guarantee that our findings could be accurately generalized and applied to any similar phenomenon on the Internet. That said, we believe we have provided an important working hypothesis and a method for any generalized study conducted hereafter. When generalizing, representativeness of the research samples must be taken into account as this study carefully attempted to do. It was pointed out that the SM who responded to our web survey is those who are close to AM and do not represent all the SM who usually do not offer information. SM, who had responded to our research, were economically motivated with remuneration, unlike AM who actively write evaluation information regardless of any economical incentive, suggesting that it may have bias. Accordingly a careful examination was necessary and carried out. This fact may have a reverse effect by possibly underestimating the influence of SM.

The next issue is to search for the causes which enable @cosme to accumulate evaluation information thereby effectively inspiring purchases. Broken down the characteristics of the site are as follows: 1) target product is cosmetics, 2) designed to avoid making comment chains, 3) easy to evoke the sympathy of readers who can judge from the profile if the speaker has the same type of skin, age, etc., 4) critical comments usually stay controlled without emotional expression (ex. "Unfortunately it doesn't agree with my skin, …") and the readers find a sense of security as moral is kept high. However, it is necessary to research which specific factor actually is effective in consumer's buying behavior.

In spite of some limitations of this work, we believe that the line of thought offered in this paper have future prospects. Sites like @cosme which accumulate evaluation information and thereby influence consumer purchases, are likely to impact how manufacturers of goods can market their products. Therefore, research on a relationship between the sites like @cosme and the product manufacturers have a significant real life meaning. To this end, this research can be expanded to include the analyses of gender influences, product types and other critical factors that may influence the communication behaviour of consumers.

Studies on the behavior of SM and AM on e-networks or on businesses models aimed at internalizing the value of information have only started recently. Due to the fact that these topics involve many academic fields including but not limited to marketing, organization theory, sociology, and economics, it will be vital to integrate the accumulated studies, which will broaden the scope of the preceding study. Our task now is to build on the information gained in this study and tailor future projects accordingly.

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