

Empirical Analysis of Factors Contributing to the Viral Spread of Message on Social Networking Sites

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Abstract

The surge in the internet users across the world has fueled the development of social networking sites. These sites are present across all platforms and they are being made use of by marketers for advertising and connecting with the consumers. The study considers viral marketing as a tool for communicating messages over social media by marketers for its brand and/or product in an exponentially growing way by consumers voluntarily. Despite literature available on viral marketing, the factors contributing to the same are still elusive. The paper identifies the factors contributing to the viral spread of messages on social networking sites. The factors identified were message content, diffusion amongst peers, source credibility and viral spread.

Keywords: Viral Marketing, Word-of-mouth, Social media, Electronic communication.

I. Introduction

Jeffery Rayport in 1996 first introduced this concept which has been extensively discussed in literature over the years. However, social media's extensive use across sectors, it has gained prominence. Social media strategy is becoming central to organizations that have internet savvy customers. Moreover, it's the most popular channel of communication among millennials (Pelling & White, 2009). Due to the prominence attained by social media in marketing, literature has rapidly developed in recent years (Dolan, Conduit, Fahy, & Goodman, 2016).

According to Kaplan & Haenlein (2010), social media are the "group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content." Social networking sites are of benefit to both marketers and consumers alike. SNS like Instagram, Facebook and Twitter significantly impact people's lives by connecting

those that trust SNS. These websites facilitate online interactions and promote sharing views and ideas, events, activities within networks of likeminded individuals. These constitute online word-of-mouth (WOM) since users reproduce the information on Social networking sites (Gunawan & Huarng, 2015).

The present study discovers the structure of factors underlying the viral spread of a message via social media. A social media campaign in a closed environment with control over the message was considered for the study, wherein the actors for the campaign are known. These actors facilitated the likes, shares and comments leading to engagement and spreading of the message on Facebook platform. The research surveyed 311 unique users who saw the campaign and participated in it voluntarily. The five dimensions considered for the study were product characteristics, message content, diffusion, campaign structure and peer information channel. Based on factor analysis, three factors were identified contributing to the viral spread of the

social media campaign. The factors were message content, diffusion amongst peers and viral spread.

II. Review of Literature

Electronic Word-of-Mouth Communication

With emergence of social networks or platforms, extensive studies are conducted on the subject. Earlier studies on e-WoM are related to online communication (Godes & Mayzlin, 2004), social learning (Ellison & Fudenberg, 1995), online communities (J. Brown, Broderick, & Lee, 2007), intention to purchase (Sawaftah, Calcioglu&Awadallah, 2020; Baber, Thurasamy, Malik, Sadiq, Islam, & Sajjad, 2016), negative WOM happening via social networking sites (Zhu, Yin & Lin, 2019; Balaji, Khong, & Chong, 2016), interpersonal impact (J. J. Brown & Reingen, 1987), and consumer buying decision (Rabidas& Bowen, 2019; Basri, Ahmad, Anuar, & Ismail,

2016). WoM definitions by researchers like Westbrook (1987) and Bone (1992); (1995) have all been inspired by that of (Arndt, 1967), focusing on the non-formal facet of WOM, which provides the communicator with the independence from the commercial source.

Past research on WOM communications have established great impact on the consumers (Goyette, Ricard, Bergeron, & Marticotte, 2010). WoM significantly influences consumer attitudes and actions and has multifold impact than traditional print media (Katz, Lazarsfeld, & Roper, 2017). For people at receiving end, it helps to risk involved in decision making as also the time taken to arrive at decisions (Chiu, Hsieh, Kao, & Lee, 2007), as the community of friends/supporters are thought of as unprejudiced foundations of data (Smith, Coyle, Lightfoot, & Scott, 2007).

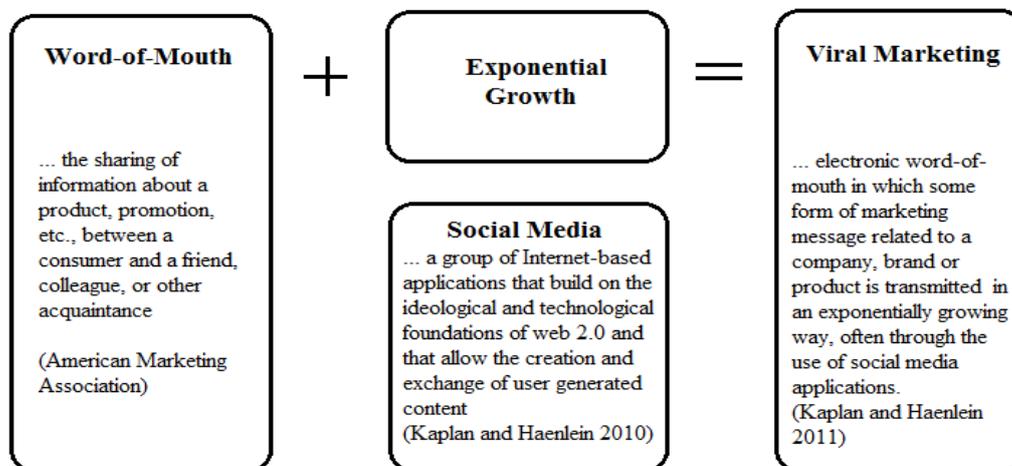


Figure 1. Relational influences between WoM and viral marketing

During the era of internet surge Buttle (1998), cited WoM can be a enables through electronic media. With ever increasing number of people going online, individuals engaged in electronic exchange of product/services information (Cheung & Thadani, 2010) and also voicing their concerns and experiences related with the products (Dumenco, 2010) using internet technologies (Huang, Cai, Tsang, & Zhou, 2011). While e-WoM has a disadvantage against

traditional WoM due to its impersonal character. Yet, its speed of spread, scale of reaching out to general public and its credibility, partly because of its impersonal nature makes it more effective as against traditional WoM (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004). Just like research related to WoM, research done so far on e-WoM also focuses on motivations for participating (Hennig-Thurau et al., 2003), processes involved (Boon et al., 2012; Lee &

Youn, 2009), user characteristics like demography, psychography etc. identification(Williams, Crittenden, Keo, & McCarty, 2012), or the influence of eWoM on establishments(Varadarajan, Yadav, & Shankar, 2008).

Similar to traditional word of mouth, electronic WoM— has resulted in influencing consumer behavior and purchase attitudes (Kulkarni, Kalro, Sharma & Sharma, 2020; Chevalier & Mayzlin, 2006) and result in higher value customer acquisition for the organization (Trusov, Bucklin, & Pauwels, 2009). A managerial implication of the inherent anonymous nature of online feedback mechanism is that organizations can strategically misuse it to enhance revenues by manipulating comments and give a false picture of product and service quality offered (Dellarocas, 2003, 2006). Electronic WoM makes it possible for firms to collect and analyze the comments exchanged through community networks (Godes & Mayzlin, 2004). This line of research, is discussed to as netnography in earlier works(Kozinets, De Valck, Wojnicki, & Wilner, 2010)which leads to valuable insights generated due to observation of consumer behavior in an unobtrusive way. As opposed to the advantages of traditional word of mouth of reliability and trust associated with the source, the e-WoM has lower cost, rapid along with huge geographic reach, is highly target oriented and a very high response rate (Okazaki, 2008).

III. Viral Marketing

Viral marketing is said to be the consumers' WoM communication through electronic media like social networking sites; derives its name due to the spreading characteristics of a virus by taking advantage of multiplication of the transmitted messages(Vilpponen, Winter, & Sundqvist, 2006). According to Odén & Larsson

(2011), images, blogs and articles are used by viral marketers.

Viral marketing means a rapid and very high rate of reply and gives unprecedented opportunity for connections at global level all of this at a low cost("Chris" Yang, Liu, & Zhou, 2012). Previous research has laid emphasis on the impact of social networks in sharing of content and in viral marketing. The parameters studied were network structure, social influence and social interaction. Vilpponen et al.(2006) applied the network theories to diffusion research. Scholars have often taken into account the complete network diffusion for analysis in the studies of virality. The emotional tone of email messages and the forwarding intentions were examined by (Eckler & Bolls, 2011). Spread of user-generated videos on YouTube was studied by Susarla et al. (2012). The research found significant influences on the magnitude of social interactions and also the success of contagion.

Camarero & San José (2011)discussed dynamics of VMreferring to the manner of receiving and/or forwarding messages to contacts over the social networks. A response loaded with emotions is triggered in the recipients. The element of surprise is also crucial for effectiveness of viral messages. Although the importance of surprise cannot be negated, it alone does not ensure success of message, hence it must be intertwined with sentiments to ensure forwarding behavior by capturing the imagination of the recipient (Rakić & Rakić, 2014). As viral marketing attracts users to virtual communities it is demanding on social interaction of products and services and influence consumer buying decisions (Hennig-Thurau et al., 2004). Beldad et al. (2010) suggested that because of available information and interaction on a site, customers tend to purchase those products.

Table 1. Possible benefits of viral marketing

Category	Benefit	References
Financial aspects	Inexpensive	(Dobele et al., 2005; Kaikati & Kaikati, 2004; Welker, 2002)
Speed of diffusion	Minimum time for audience reach	(Kaikati & Kaikati, 2004)
	Rapid diffusion	(Helm, 2000; Welker, 2002)
	Boosts adoption speed	(Dobele et al., 2005)
	Exponential	(Helm, 2000)
Transmission amongst peers	Voluntary act of transmission by sender	(Dobele et al., 2005)
Reach of audience	Effective targeting	(Dobele et al., 2005)
	Diversity achieved for audience through social contacts	(Helm, 2000)

IV. Methodology

The research objective and the subsequent findings are twofold in nature. The first part is a real-life case analysis carried out on Facebook platform and the findings associated with the same. Further a questionnaire was administered to get responses from 311 samples who were directly or indirectly involved with the social media campaign. The respondents comprised of the management of the institute, the employees and the students. The data collected was done through online questionnaire which took 10 minutes to complete. The sample comprised of 197 males (63.34%) and 114 females (36.65%) respondents (see table 3).

V. Results

The paper investigates the underlying factor structure for viral spread of a social media campaign. The method of exploratory factor analysis used here condenses variables into a much smaller number of factors. These though being fewer in number are a substantial part of the total variability. After conducting review to identify highest correlated items with a factor, final factors emerge. The highest correlated items with a factor together express the meaning of that factor based on common theme underlining those items. For a successful outcome of factor analysis, few factors should explain a substantial portion of the total calculated variability.

Table 2. Important factors for viral marketing campaigns

Critical factor	Specific aspects
Diffusion of message (Kaikati & Kaikati, 2004)	Exponential growth (Helm, 2000) Speed of diffusion (Helm, 2000; Welker, 2002) Audience reach (Kaikati & Kaikati, 2004)
Peer-to-peer information characteristics (Dobele et al., 2005)	Available channels and its use (Moran & Gossieaux, 2010; Woerndl, Papagiannidis, Bourlakis, & Li, 2008) Available technology, also leveraging of multiple technologies Credibility of source (Fan & Miao, 2012; McKnight & Kacmar, 2006)
Message content (Berger & Milkman, 2012; Dobele et al., 2007; Gardner, Sohn, Seo, & Weaver, 2013; Woerndl et al., 2008)	Imagination (Dobele et al., 2007) Fun & intrigue (Dobele et al., 2007) Ease of use (Dobele et al., 2007) Engaging (Dobele et al., 2007)
Product/Service characteristics	Suitability (Goldenberg, Han, Lehmann, & Hong, 2009)
Campaign Structure characteristics	Helps in viral activity Legal and ethical challenges (Phelps et al., 2004)

Table 3. Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Audience reach	3.0129	1.27247	311
Source credibility	3.1704	1.47010	311
Imagination	3.5627	1.35424	311
Fun & Intrigue	3.5884	1.23042	311
Engaging	3.0707	1.38009	311
Voluntary transmission by sender	3.3248	1.33465	311
Suitability	3.2122	1.40505	311
Encourages Viral Activity	4.1672	0.89678	311
Targeting	2.5949	1.56880	311
Exponential	2.7299	1.70323	311
Speed of spread	3.0514	1.36922	311
Access to diverse audience	2.6431	1.27682	311

For this study, a legitimate assessment for the viral marketing spread of campaign using social media has been obtained. The success of these campaigns is measured by adding up items of similar type to calculate the total scores for representing multiple dimensions and the factor(s) contributing to the maximum for the spread and reach amongst audience. Factors are a representation of the dimensions. Descriptive statistics are presented in Table 3 of item responses.

In Table 4, smaller Standard Deviations than the respective means are observed which indicates no gross observation. With Maximum likelihood estimation method factors were extracted from the variable data. Kaiser's rule that a factor should explain minimum one variable's variance was employed. This rule was used to determine the most eligible factors for interpretation. A total of four factors were extracted (Table 5) explaining around 69.231% variance. A detailed review and analysis of initial factor loadings require a correct resolution possible through maximum likelihood, as it converged to ten iterations.

Table 4 Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.366	44.715	44.715	3.527	29.389	29.389
2	2.177	18.142	62.857	3.417	28.476	57.865
3	1.496	12.469	75.326	.756	6.299	64.164
4	1.082	6.835	82.161	.621	5.919	69.231
5	.691	5.757	87.918			
6	.475	3.962	91.880			
7	.310	2.583	94.463			
8	.235	1.955	96.417			
9	.157	1.312	97.730			
10	.128	1.064	98.794			
11	.081	.673	99.467			
12	.064	.533	100.000			

The results show a non-positive and definite solution as seen from table 6, thus meeting the condition for further interpretation. Further inspection of communalities was interpreted. Multiple regression is used to interpret the communalities using multiple R². Communalities are useful to indicate the degree of factors explaining the variance of the variables divided into two - first the initial set and the second, extracted set. The communalities in the present study are well within the accepted range thus providing results which are appropriate for interpretation which are shown in Table 7.

Maximum likelihood with linear transformation of data provides results which are more permissible owing to the confidence in them thus providing better interpretations. Oblimin rotation procedure was chosen over the other procedures, as it allows correlation among the factors resulting in higher eigenvalues but diminished interpretability of the factors. Interpreting the factor correlation matrix justifies the use of Oblimin method results as one value in the correlation matrix exceeds 0.25 value as seen in Table 8.

Table 5. Total Variance Explained

Factor	Rotation Sums of Squared Loadings
	Total
1	4.358
2	3.890
3	1.147
4	1.109
5	
6	
7	
8	
9	
10	
11	
12	

Extraction Method: Maximum Likelihood.

- a. In case factors are correlated, total variance cannot be obtained by adding sums of squared loadings

Table 9 shows grouping of 4 factors theoretically. The coefficients suggest that based on the responses of people to the viral spread of a social media campaign items was very consistent for fun & intrigue, imagination, source credibility, voluntary transmission by sender and was engaging. The rating by the respondents to fun and intrigue tended to be very similar to other variables stated. If a person perceived the campaign to be fun and intriguing, that person probably also felt the campaign to be imaginative, coming from a credible source further leading to voluntary transmission by the sender and engaging and vice versa. More prominence is seen in contributions to factor 1 and factor 3. 64% of the variance is shared by fun and intrigue (correlation .919) with the first factor. The remaining factors are identified by analyzing the coefficient magnitude (see table 7). Factor names identified are as follows: (1) Message content; (2)

Diffusion amongst peers; (3) Viral spread and (4) source credibility.

Table 6 Factor Matrix^a

	Factor		
	1	2	3
Fun & Intrigue	.999	-.014	.003
Imagination	.836	.177	-.287
Source credibility	.738	.075	-.160
Engaging	.556	.192	-.128
Audience reach	.542	.426	.463
Targeting	.214	-.097	.174
Exponential	.087	.856	.386
Suitability	.460	.839	-.195
Speed of spread	.183	.798	.341
Voluntary transmission by sender	.448	.709	-.250
Encourages Viral Activity	.415	.679	-.103
Access to diverse audience	.098	-.338	.098

Extraction Method: Maximum Likelihood.^a

- a. 4 factors extracted. 10 iterations required.

VI. Discussions

This research was undertaken with the objective of ascertaining factors contributing to the spread of a message on social networking sites thus leading to viral marketing. Literature review brought up various factors which sourced into the spread of a message over social media. Taking reference to the earlier studies pertaining to word of mouth communications and viral marketing, the researcher identified twelve factors viz., audience reach, source credibility, imagination, fun & intrigue, engaging, suitability, encourages viral activity, exponential, speed of spread, targeting and access of diverse audience and voluntary spread by sender (Berger & Milkman, 2012; Dobele, Lindgreen, Beverland, Vanhamme, & Van Wijk, 2007; Goldenberg, Han, Lehmann, & Hong, 2009; Helm, 2000). Based on maximum likelihood and oblique rotation method of factor analysis along with Kaiser Normalization, four factors were identified contributing to the spread

of content on social media platform; Facebook. The results provided further evidence to the factors, message content, diffusion amongst peers, source credibility and viral spread as they impacted the most for making a message or content viral.

Table 7. Communalities^a

	Initial	Extraction
Audience reach	.731	.690
Source credibility	.782	.576
Imagination	.838	.813
Fun & Intrigue	.864	.999
Engaging	.557	.362
Suitability	.877	.954
Encourages Viral Activity	.670	.644
Exponential	.853	.890
Speed of spread	.807	.786
Voluntary transmission by sender	.755	.766
Targeting	.547	.086
Access to diverse audience	.558	.133

Extraction Method: Maximum Likelihood^a

a. One or more communality estimates greater than 1 were encountered during iterations. The resulting solution should be interpreted with caution.

Table 8. Factor Correlation Matrix

Factor	1	2	3	4
1	1.000	.402	.117	.521
2	.402	1.000	-.228	.365
3	.117	-.228	1.000	.294
4	.521	.365	.294	1.000

Extraction Method: Maximum Likelihood

Rotation Method: Oblimin with Kaiser Normalization.

Table 9. Structure Matrix

	Factor			
	1	2	3	4
Fun & Intrigue	.919	.247	.498	.099
Imagination	.895	.258	.127	.129
Engaging	.601	.262	.072	.174
Source credibility	.743	.194	.219	.743
Voluntary transmission by sender	.684	.641	-.393	.684
Exponential	.239	.930	-.301	.720
Speed of spread	.322	.885	-.241	.415
Suitability	.720	.781	-.440	.262
Audience reach	.514	.699	.248	-.084
Encourage viral activity	.609	.664	-.305	.273
Access to diverse audience	-.032	-.234	.327	.315
Targeting	.127	.039	.268	-.116

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

This paper synthesized available literature on viral marketing and empirically analyzed the factors responsible for viral spread of messages over social media. The validity of the empirical analysis was based on literature reviewed and using exploratory factor analysis ascertained the factors credited for viral spread for a social media campaign.

VII. Conclusion

People are increasingly enrolling on social networking sites and are engaging in conversations. Newer technologies and ideas of social networking platforms are born every now and then and they are able attract and engage the public. With this the companies have realized the potential of social networking sites for promotion of their product and services. This has led to indulgence of companies and users in discussions at various levels, giving rise to amalgamation of the overall customer experience with engagement.

In the present study the factors responsible for viral spread of the marketing campaign on Facebook social media platform was analyzed

considering the different factors drawn from past literature. The factors found impacting the viral marketing of the social media campaign were the message content, diffusion of the message amongst peers, source credibility and the effective viral spread of the message. These factors further enable and result in the viral spread of the message amongst peers and also to different users who are directly or indirectly concerned or connected with the peers. Managers can use this information for writing and creating of message which incorporate these three factors so as to channelize their combined strength and engage more customers with their brand. Further research areas can be related to analyzing the marketing campaign for a company using different social networking platforms and weighing in on the advantages or disadvantages of them over others.

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