

# Knowledge-Sharing and Influence in Online Social Networks via Viral Marketing

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Online social networks are increasingly being recognized as an important source of information influencing the adoption and use of products and services. Viral marketing—the tactic of creating a process where interested people can market to each other—is therefore emerging as an important means to spread-the-word and stimulate the trial, adoption, and use of products and services.

Consider the case of Hotmail, one of the earliest firms to tap the potential of viral marketing. Based predominantly on publicity from *word-of-mouse* [4], the Web-based email service provider garnered one million registered subscribers in its first six months, hit two million subscribers two months later, and passed the eleven million mark in eighteen months [7]. *Wired* magazine put this growth in perspective in its December 1998 issue: “The Hotmail user base grew faster than [that of] any media company in history—faster than CNN, faster than AOL, even faster than *Seinfeld*’s audience. By mid-2000, Hotmail had over 66 million users with 270,000 new accounts being established each day.”

While the potential of viral marketing to efficiently reach out to a broad set of potential users is attracting considerable attention, the value of this approach is also being questioned [5]. There needs to be a greater understanding of the contexts in which this strategy works and the characteristics of products and services for which it is most effective. This is particularly important because the inappropriate use of viral marketing can be counterproductive by creating unfavorable attitudes towards products. Work examining this phenomenon currently provides either descriptive accounts of particular initiatives [8] or advice based on anecdotal evidence [2]. What is missing is an analysis of viral marketing that highlights systematic patterns in the nature of knowledge-sharing and persuasion by influencers and responses by recipients in online social networks. To this end, we propose an organizing framework for viral marketing that draws on prior theory and highlights different behavioral mechanisms underlying knowledge-sharing, influence, and compliance in online social networks. Though the framework is descrip-

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tive, it can be used prescriptively to determine the characteristic of viral marketing strategies appropriate in different contexts.

## Background

Social information-processing theory provides a useful lens to examine the interpersonal influence processes that are the hallmark of viral marketing since it views the social network as an important source of information and cues for behavior and action for individuals [11]. Prior studies examining the diffusion of innovations and the transmission of ideas in social networks have viewed the interpersonal influence as occurring largely from face-to-face interactions [3]. However, interpersonal influence in viral marketing occurs in computer-mediated settings and is significantly different from that occurring in conventional contexts in several ways.

First, the scale and scope of influence is considerably expanded—computer mediation allows a much larger number of individuals to be connected by informational linkages than feasible through face-to-face contact or through conventional media such as the telephone. For instance, the effort to email a message to all contacts in the address book is only marginally more than the effort in sending the message to just one recipient. On average, the reach of individuals—the number of *connected others*<sup>1</sup> that they can influence, increases considerably. Further, this reduction in the effort needed to reach out to others increases the number of occasions when individuals act on their natural impulse to share knowledge and pass along information they consider useful and timely to others in their social network. Together, this results in an enormous increase in the extent of influence through knowledge-sharing and information transfer in online networks.

Second, computer-mediated communication media provide the unprecedented ability to connect individuals synchronously (for example, using instant messaging) as well as asynchronously (through email). The new media thus broaden the availability of recipients, literally enabling influencers to access connected others around-the-clock. Third, in many cases, the media provide realtime feedback on the impact of influence, enabling motivated individuals to rapidly adapt their influence strategies and progressively enhance the effectiveness of their influence attempts. As a result, the ability to exert influence is considerably enhanced [11].

Overall, the ability to influence a large number of individuals, the minimal effort required to make influence attempts, and the flexibility to deploy a variety of influence strategies through information technologies are a potent combination making influence in online social networks considerably more compelling and pervasive than in conventional interpersonal interactions.

## Framework for Viral Marketing

We highlight two factors that play a key role in determining the nature of influence episodes in viral marketing. The first is the *role of the influencer*—whether the attempt to influence is passive or actively persuasive. The second is the level of *network externalities*—the additional benefits accruing from broader usage of the product or service being recommended within a user community. Network externalities in the case of a product or service are benefits, in addition to those directly derived from usage, that accrue broadly to

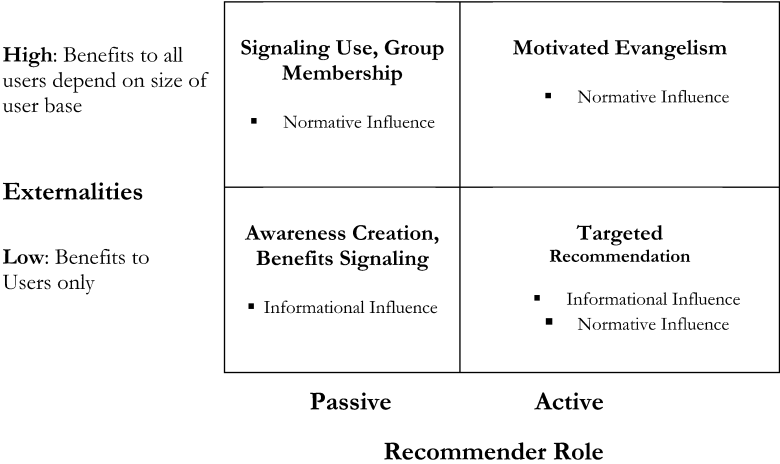
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<sup>1</sup>We use the term *connected others* to refer to the set of individuals whom a focal individual can reach using CMC media.

the set of all adopters [10]. For instance, in the case of a word processing package, the benefits from the increased probability of having knowledgeable users to turn to for help when encountering problems or the ability to exchange documents easily are network externalities created when a workgroup or community adopts and uses the same software. Together, these two dimensions highlight four quadrants—regimes in which the nature of the influence and the factors underlying the recipient’s decision to comply with the influence attempt are qualitatively different (see Figure 1). The descriptive labels used for the four quadrants of the framework are:

**Awareness Creation and Benefits Signaling (ACBS).** In this quadrant, the role of the influencer in persuasion is passive and the network externalities are minimal. Users emailing online greeting cards from Web sites such as Hallmark or BlueMountain to connected others represent typical instances of ACBS. When a user sends out a card from the site, the recipients get a personalized email message informing them of a greeting created by the sender available at the site and providing the URL to access it. The URL directs visitors to the card on site and once there, he or she is offered the choice to send a greeting to the original sender or to a connected other. In this process, recipients are made aware of the service offered by the site and are persuaded to use it. The role of the influencer is mainly to create awareness and signal benefits to others within their social network and can be particularly influential in encouraging trial and adoption of novel products and services. As in the case of Hot-mail, this can be very important in helping to build a large user base in a very short time.

**Targeted Recommendation (TR).** This quadrant comprises contexts in which the influencer plays an active role in spreading the word and the network externalities are minimal. A user emailing a news story from an online content site to a connected other is an instance of this quadrant. Most online content sites such as ESPN, MSNBC, and NYTimes offer the “send this story to a friend” option on their sites [8]. These features make it possible for the a recommender to send an email message with the URL of the particular story in it.



**Figure 1.** Framework for viral marketing.

## Car Service

Honda Motor Europe unveiled the Honda Civic with a lifestyle-oriented campaign “Live the Civic” at the Paris Motor Show in September 2000. Honda used a viral marketing technique to sustain customer interest and gather data on potential buyers for the car. A set of amusing video clips playable over the Internet were distributed to 300 influencers to kick off a contest where participants’ chances of winning increased if they forwarded the videos to others. Reports suggest that this was responsible for nearly half a million individuals visiting the Honda Web site for the new car in the first three months with the video clips being forwarded almost 80,000 times. The viral marketing campaign is also credited with generating over 10,000 promising leads for the new car [1]. (Site tracking viral messages popular in UK: [viral.lycos.co.uk/](http://viral.lycos.co.uk/))

TR’s utility hinges on the ability of the recommender to accurately predict the recipient’s interests and preferences (based on his or her private information). This is advantageous for sites that offer a broad array of content (such as ESPN.com which covers sixteen sports in detail), as the information provided by the influencer enables relevant content to be provided to recipients. The information provided by influencers thus enables the site to successfully serve a broad audience in a focused manner. The efforts of firms such as Amazon.com and eBay to encourage users to email the details of products and prices to friends, and of the large number of music sites such as mp3.com that provide facilities for users to email music to friends sharing their interests are instances of viral marketing initiatives in this quadrant.

Though there is little reliable data on the effectiveness of this approach, the experience of ideavirus.com, a content provider, indicates that 56% of the recipients referred to content at the site by a recommender visited it and over 60% of these visitors also downloaded content that was recommended. This suggests that influencers can be fairly accurate in anticipating interests of connected others, signaling the promise of this approach to identify potential adopters and users.

**Signaling Use, Group Membership (SGM).** This quadrant comprises contexts where the influencer’s role is passive but there are significant externalities accruing to both the recipient and the influencer. Instances include the use of specific kinds of products, for example, file compression utilities such as winzip and animation software such as Flash. When a user sends the connected other a file compressed using winzip as an email attachment or makes a Flash animation available on a homepage, the recommender’s role in spreading the word about the software is passive.<sup>2</sup> In the initial stages of the lifecycle when a software package is not widely known and used, early users are generally viewed as being technically advanced. The influencer’s rec-

<sup>2</sup>In each case, the recipient of the influence is informed of the need to download a software component to deal with the \*.zip file or view a flash animation.

ommendation, albeit passive, has the effect of signaling the user's membership in a group with desirable attributes. There are positive externalities associated with usage as all users benefit from the broader base of support services for the format enabled by wider adoption.

Several successes exemplify the use of this strategy. For instance, Adobe Corp. benefited considerably by users implicitly endorsing their proprietary document format (PDF) by emailing attachments in this format. Recipients could download the free read-only version of Adobe Acrobat to view the PDF files they received. The legitimization of the proprietary format by lead-users helped establish the PDF format and has spurred the sales of Adobe Acrobat, the package used to create PDF files. This strategy of gaining widespread currency by being associated with lead-users and influencers is typical of viral marketing initiatives in the SGM quadrant. The strategies of Winzip Computing and Real Media, firms trying to make their proprietary data compression format and music encoding format indispensable to users, also fall into this quadrant.

**Motivated Evangelism (ME).** This quadrant comprises contexts where recommenders play an active role in influencing connected others and there are significant network externalities accruing to both influencers and recipients.

ICQ—an instant messaging application—and Dialpad—an application to place telephone calls over the Internet—are instances of motivated evangelism. In these instances, the influencer as well as the recipient need to use the product for either of them to benefit. The structure of benefits motivates early adopters to actively persuade connected others to also try the product so that they can both use the product. And as the base of adopters grows, benefits to the entire user base are enhanced as the product can be used to send messages or initiate calls to a wider audience. It is feasible, and this indeed is the marketer's dream, that each new user turns into an evangelist for the product or service in their social network and, as a result, the user base for the product grows exponentially. ICQ currently has over 150 million users worldwide and the user base was estimated at one point to be growing at the rate of 100,000 new users every day. Similarly, the rapid spread of the use of Dialpad—that gained seven million users in the first seven months—is a success story exemplifying the potential of ME to create a bandwagon effect [10] and accelerate adoption.

Yet another service falling into this quadrant is membership in buying groups at sites such as letsbuyit.com and the now defunct firm—mobshop.com [6]. In a buying group, the price to be paid for items, such as PDAs and TVs, is a sliding scale with the price decreasing in proportion to the size of the buying group created for the product. Early members of the buying group are therefore highly motivated to spread the word to members of their social network to participate. Further, each member joining the group is motivated to spread the word, a feature that can result in a snowballing effect on the number of users of the service.

## Discussion

The proposed framework presents insights into the nature of influence when current users are sources of product information to connected others and highlights contexts characterized by varying levels of persuasiveness of influencers, and varying pressures to conform to recommendations by recipients. Behavior in response to referrals results from two alternative models of influence [9]: *normative influence*—where recipient behavior is based on interpreting the information provided by the influencer as an implied expecta-

tion to conform, or *informational influence*—where recipient behavior is based on a personal evaluation of the information provided by the influencer.

In contexts of normative influence, the mechanisms influencing action are *identification* and *compliance*. Recipient behavior is driven by the desire to maintain the relationship with the influencer and/or be associated with a referent group by fitting in in order to evoke a favorable response from the group. The recipient's willingness to conform is stronger when recipient behavior is observable to the influencer and to others in the social network.

In contrast, the mechanism underlying informational influence is *internalization*, where behavior occurs only when such action is congruent with the recipient's value system and by a personal evaluation of the benefits. Such compliance involves independent information processing by recipients with the goal of maximizing outcomes for themselves.

Overall, behaviors linked to normative influence are driven by recipients' desire to comply, and direct benefits from the action for recipients are often a secondary consideration. In contrast, behavior linked to informational influence arises from an evaluation of the direct benefits to the recipient. While behavior linked to normative influence is often discontinued when recipient action is not observable or salient to the influencer or the group, behavior in response to informational influence is usually sustained and incorporated into habitual actions of respondents over time.

An important contribution of the framework is it highlights contexts where each of these influence sources is dominant. Informational influence is the central mechanism in Awareness Creation and Benefits Signaling. In contrast, normative influence is the central mechanism in Signaling Use, Group Membership and Motivated Evangelism. Either of these influences could play a role in Targeted Recommendation—determined by other factors such as the extent to which recipient behavior is observable to the recommender. Where recipient behavior is observable, normative influences are more likely to be dominant.

The framework also provides insight into the importance of influencer characteristics and recipient characteristics in influencing behavior. In Targeted Recommendation and Motivated Evangelism, the characteristics of the influencer play an important role. Some individuals wield more influence than others due to such factors as their specialized expertise, self-confidence, assertiveness, and social status. Consequently, the benefits of co-opting such individuals, often referred to as *effluentials* is useful mainly for the Targeted Recommendation and Motivated Evangelism quadrants. In contrast, recipient characteristics determine outcomes in the Awareness Creation and Benefits Signaling and Signaling Use Group Membership quadrants. Novices—individuals with less experience with a product or service—are more likely to comply than those with prior experience with the product category [10].

In addition, the framework highlights the alternatives to help potential users overcome knowledge barriers to adoption. In the Targeted Recommendation and Motivated Evangelism quadrants, the influencer can be relied on to fill the potential user's knowledge gap. Firms can consider providing resources to help influencers playing this role. On the other hand, in the Awareness Creation and Benefits Signaling and Signaling Use Group Membership quadrants, recipients who want to adopt products are, to a great extent, on their own and firms can focus on addressing the informational needs of inexperienced users to lower barriers to adoption and use. Fur-

Company Name	How the viral initiative works	Quadrant
<a href="#">BlueMountain</a>	Recipients get a personalized email message to visit the Web site and view the e-greeting. This creates awareness of product and services offered by the website to the visitor.	ACS
<a href="#">ICQ</a>	Users at both ends – call initiator and receiver are required to be using the software to communicate. Benefits accrue to both and hence, active persuasion by early adopters is common.	ME
<a href="#">Adobe Acrobat</a>	Recipients of files in the PDF format are directed to Adobe's Web site to download the free reader. Senders in this case endorse the product implicitly.	SGM
<a href="#">ESPN</a>	Offers an option for visitors to "send a story to a friend". Recipient is directed to ESPN's Web site for the story.	TR

Note: A company may be involved in more than one type of viral marketing effort. We have chosen to represent it in a quadrant that is dominant.

**Figure 2.** Viral marketing initiatives.

ther, in all these instances, providing feedback to the influencer on adoption (or non-adoption) by the recipient can be beneficial and allow the influencer to offer assistance if noncompliance is linked to unfamiliarity with features or the benefits of the product or service. Figure 2 describes viral marketing initiatives in the different quadrants of the framework.

## Conclusion

Viral marketing is a complex phenomenon and the proposed framework draws attention to a variety of factors important in determining outcomes: user influence and recipient behavior. Attributes of the product or service determine the quadrant and the dominant character of the user influence. The quadrants are associated with different mechanisms of compliance; the framework highlights contexts where the characteristics of the influencer and the recipient are key to explaining outcomes. The framework can also facilitate decisions regarding the nature of ancillary resources required.

Viral marketing is a powerful means for both marketers and recipients to benefit from the innate helpfulness of individuals in social networks. However, success hinges upon the recognition of the strong need for influencers to be viewed as knowledgeable helpers in the social network rather than as agents of the marketer. Schemes that make overt attempts to co-opt users to promote products and services are likely to upset the balance and reduce the effectiveness of the approach to the detriment of both the marketer and users who may have benefited from the knowledge-sharing acts of influencers. Firms would do well to reflect on this very carefully in planning viral marketing efforts.

## References

1. Best use of technology: Viral marketing. *Marketing* (2001), 13.
2. Andrews, P. Katie Couric not needed if you've got net. *The Seattle Times*, Business and Technology (2002).
3. Bansal, H. S., and Voyer, P. A. Word-of-mouth processes within a service purchase decision context. *Journal of Service Research* 3, 2 (2000), 166–177.
4. Helm, S. Viral marketing—Establishing customer relationships by “word-of-mouse.” *Electronic Markets* 10, 3 (July 2000), 158–161.

5. Higham, N. How viral marketing can lead to virtual pestilence. *Marketing Week* (2000), 17.
6. Kauffman, R. J., and Wang, B. New buyers' arrival under dynamic pricing market microstructure: The case of group-buying discounts on the Internet. *Journal of Management Information Systems* 18, 2 (2001), 157–188.
7. Kelly, E. This is one virus that you want to spread. *Fortune* (2000), 297–300.
8. Krishnamurthy, S. Online message dissemination: An analysis of “Send this message to your friend” data. *First-Monday* (2001).
9. Lascu, D.-N., and Zinkhan, G. Consumer conformity: Review and applications for marketing theory and practice. *Journal of Marketing Theory & Practice* 7, 3 (1999), 1–12.
10. Shapiro, C., and Varian, H.R. *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School Press, Cambridge, MA, 1999.
11. Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., and Haythornthwaite, C. Computer networks as social networks: Collaborative work, telework, and virtual community. *Annual Review of Sociology* 22 (1996), 213–238.