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Social and attitudinal determinants of viral marketing dynamics

Carmen Camarero *, Rebeca San José [1]

Facultad de Ciencias Económicas y Empresariales, Avenida Valle Esgueva 6, 47011 Valladolid, Spain

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ABSTRACT

At this time of uncertainty, viral marketing is emerging as one of the most intriguing communication strategies, due to low cost and the results it obtains. However, the success of this kind of practice depends on a range of factors including what we explore and refer to in the present research as the individual's "viral dynamics". We thus propose a causal model in which viral dynamics is determined by the individual's social capital and prior attitudes. Based on a survey of young adults, the authors test the effects of structural and relational capital as well as attitudes on viral dynamics. The results evidence that the individual's connectedness in the email network does not impact viral dynamics, whereas the individual's integration and relationship with the network and the attitudes towards viral messages prove critical to the individual involved in the receiving-forwarding process.

1. Introduction

In recent years, conventional means of communication have become increasingly ineffective (Nail, 2005), and have begun to give way to more innovative communication tools due, to a great extent, to the enormous strides in information technologies (IT). With the growth of the Internet, electronic peer-to-peer communication has become a major phenomenon (DeBruyn & Lilien, 2009). Individuals can share opinions and information with others (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004) more easily and than ever before, virtually free of charge. The Internet is a large-scale means of personalization enabling vast numbers of people to be reached in a one-to-many process, similar to conventional mass media, but with the added advantage of message personalization, for instance through email messages, which resemble interpersonal communication in that they can be tailored to the individual (Phelps, Lewis, Mobilio, Perry, & Raman, 2004). This has led to clients having more power than ever before.

Communication is no longer restricted to the conventional one-way firm to consumer approach, or to more recent two-way or bidirectional communication. Communication now flows in a variety of ways, exploring the links or relations that individuals have with others through IT. Furthermore, at a time when consumers display ever-diminishing trust in firms and their advertising messages, word-of-mouth (WOM) communications are proving increasingly popular, particularly since the source (which communicates or convey a message) is known by the message recipient, thus influencing consumer beliefs and attitudes (Brown, Broderick, & Lee, 2007; Cheung, Anitsal, & Anitsal, 2007). Yet, the evolution of the Internet, email and the second generation of the web – or web 2.0, the web built by everyone for everyone (such that many to refer to web 2.0 as the social or democratic web) –, as well as social media in general (Facebook, Twitter, Blog, etc.) have led to the WOM phenomenon taking on gigantic proportions. Whilst it has traditionally been held that, on average, satisfied consumers pass on their satisfaction to three other people and dissatisfied consumers to eleven, the emergence of IT has meant that the scope and reach of such messages can multiply beyond the mere exponential. For instance, a person in Facebook has an average of around 150 contacts, each of whom in turn has a similar number of contacts in their network. Each message posted on their wall is automatically distributed and sent out to all their contacts and may be commented on, shared or forwarded by these subjects to the same number in their own network. A similar effect may be achieved by forwarding emails to contacts in a person's address book or by publishing messages or opinions in forums and blogs, which any net user may access and pass on. One important point to note is that whilst conventional WOM is virtually restricted to those with whom there is some kind of previous contact or acquaintance (we share our opinions personally with relatives, friends, workmates, etc.), when a user posts an opinion on the Internet, the message reaches both those who are known as well as those who are not (in forums, blogs, and even some Twitter followers). Yet, not only is the scope important but also the value which individuals attach to these communications (according to a study published recently in Spain, the results of which do not differ from those obtained in other countries with similar Internet penetration rates – around 50% of the population –, 69% of users normally use the network to check out other people's opinions concerning various products/services, and 43.2% trust the information they see).

* Corresponding author. Tel.: +34 983 42 33 32; fax: +34 983 42 38 99.
E-mail addresses: camarero@eco.uva.es (C. Camarero), rebecasc@eco.uva.es (R. San José).
[1] Tel.: +34 983 42 39 51; fax: +34 983 42 38 99.

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Many see viral marketing as a form of WOM advertising in which certain consumers tell others about a product or service (Vilpponen, Winter, & Sundqvist, 2006). Viral advertising relies on provocative content to motivate unpaid peer-to-peer communication of persuasive messages from identified sponsors (Porter & Golan, 2006). In other words, firms must persuade consumers, with the support of IT and through their network of contacts, to become the vehicles through which the advertising campaign is conducted, through clicks, some authors even dubbing it Word-of-Mouse (Xia & Bechwati, 2008). Thus, rather than advertising, what we are in fact witnessing is a kind of publicity.

As expected, academic research has begun to reflect this development, numerous works appearing in recent years addressing this phenomenon. Yet, said works focus on analyzing the receipt, opening and forwarding of viral messages in an independent manner, which we feel to be insufficient. As a result, the current study explicitly incorporates the receipt and forwarding of viral messages simultaneously in the same model, a process we refer to as viral dynamics. In this respect, and focusing on email communication, we pinpoint a gap in the research which the present study aims to fill by exploring viral dynamics.

A further contribution is that this article integrates two theoretical frameworks to explain viral dynamics. Viral dynamics refers to the process of receiving, sending and/or forwarding messages from one person to another in their network of contacts, such that we need to explore the effects which the characteristics of individuals' networks and their relationships might have on the process. The popularly well know six degrees of separation theory contends that every person on the planet is connected by six nodes or links (persons). If we add to this the immediacy and facilities afforded by ICT, a campaign or viral message might theoretically spread rapidly to the population of the entire planet by simply "infecting" a small group of people. Viral communication may thus be deemed a social phenomenon, in so far as it involves a group of people through which a message circulates and who are able to mobilize the whole planet for a common cause rapidly, easily and in a way accessible to many (unthinkable just a few decades ago). Understanding how the phenomenon of viral communication works thus has implications for all areas, not just the academic (in which as yet there are no models or theories to explain the phenomenon). This proves vital for firms, in that conventional means of communication are no longer as efficient, and for society as a whole as it can impact their daily lives in addition to affecting other key decisions.

In an effort to understand this phenomenon better, we felt that drawing on postulates taken from sociology would prove enlightening. First, on the basis of the Social Capital Theory (SCT) Nahapiet & Ghoshal, 1998 and the Social Network Theory (SNT) Granovetter, 1983, we propose individuals' social capital in the email network as an antecedent of viral dynamics, that is, individuals' connectedness, integration and relationship closeness in the network. Second, on the basis of the Theory of Reasoned Action (TRA) Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975, we explore how individuals' previous attitudes, whether positive or negative, impact their perception of viral messages.

The article is organized as follows. We first review viral marketing literature and the main aspects to be researched. Second, we define the concept of viral dynamics and specify the determinants of this process on the basis of SCT, SNT and TRA. We then empirically test the proposed hypotheses, and finally discuss the main theoretical conclusions and business implications to emerge from the findings.

2. Viral marketing. Research aspects

Steve Jurvetson and Tim Draper (Knight, 1999) first coined the term viral marketing in 1997. The term describes any strategy that encourages individuals to pass on a marketing message to others, creating the potential for exponential growth in the message's exposure and influence. Like viruses, such strategies take advantage of rapid multiplication to explode the message to thousands, indeed millions (Kirby & Marsden, 2006).

At the present time, however, a lack of consensus exists concerning any clear definition of what viral marketing is. Whereas for some, viral marketing refers to word-of-mouth (WOM) communication whereby certain people talk to others about a particular product or service (Phelps et al., 2004; Rosen, 2000), for others viral marketing differs from WOM communication in that those who create the virus have a vested interest in engaging, recruiting or reaching specific individuals in the net. Put differently, the value of the virus for the person who originally spreads it is directly related to the number of other users the virus attracts (Modzelewski, 2000). Therefore viral marketing is marketing applied to WOM (Gruen, Osmonbekov, & Czaplewski, 2006), in other words, the use of WOM as a tool to disseminate the marketing campaign (hence the term buzz marketing which is also used to describe it). It is thus necessary to merge word-of-mouth with network effect theories. Vilpponen et al. (2006) define viral marketing as word-of-mouth communication in situations where positive network effects prevail and where the role of the influencer is active due to positive network effects, a standpoint that the current research shares. Put differently, the positive effect of the network is in evidence not only because the message reaches a wider audience and spreads at a greater speed but also because the response amongst individuals is more positive. In a persuasive communication context, a favorable attitude towards the source or person passing on the message, or simply a knowledge thereof, is reflected in a greater receptivity thereto, such that we speak of the multiplying effects in the efficacy of viral communication. If we add to this the fact that in viral communication it is individuals who assume the "cost" of spreading the campaign or message, the phenomenon becomes one of enormous interest to firms. Yet, even taking account of the positive effects of the net, there is still a great deal to be learnt concerning the specific effects involved in the sending and forwarding of viral messages, a gap which we aim to fill in part through the present research.

WOM refers to communication processes in which the receiver in turn becomes a broadcaster, ensuring that the information continues to circulate which, applied to a financial context, refers to a conversation between consumers concerning their experience of a specific product or service (East, 2005). The importance of WOM is key to examining consumer behavior since it plays a decisive role in the formation of their beliefs and attitudes (Brown & Reingen, 1987; Cheung et al., 2007).

As has already occurred with other communication variables, with the development of IT and the large-scale introduction of the Internet, a new kind of WOM has emerged: electronic or online mouth-to-ear (or eWOM). eWOM is perceived as any informal communication using IT concerning the usefulness of certain goods or services, as well as sellers or suppliers (Litvin, Goldsmith, & Pan, 2008). The main difference between eWOM and WOM is that the message circulates through a purely digital channel and that, coupled to what was mentioned above, there are also all the particular aspects of such channels with regard to scope, speed and ease of spreading the message.

Applied to the Internet, such opinions, both positive and negative, expressed by previous, current or potential consumers of a product or firm may be accessed by numerous individuals through the networks or links they set up using email, instant messaging, blogs or social networks. For this reason, Sussan (2005) feels that eWOM creates value for products, for the market in general and for society as a whole, since interaction amongst consumers – or each online episode – enhances understanding of the product.

Knowledge deriving from experiences with other members of a community increases and strengthens the size of the individuals' social network (internet users in this case).

Yet many questions remain unanswered and numerous debates have arisen concerning eWOM in academic and professional forums. Whereas supporters hold that eWOM is a form of communication offering tremendous potential to influence the purchase attitudes and behavior of network members (Smith, Coyle, Lightfoot, & Scott, 2007; Wangenheim & Bayón, 2004), opponents raise serious doubts regarding whether it has any real effect, pointing to the anonymity of the communicants (Guadagno & Cialdini, 2005) or the inexistence of physical or face-to-face interpersonal contact amongst those who make up the network (Gershoff, Broniarczyk, & West, 2001).

The email provides the context for the current research. Of the various kinds of eWOM on the Internet (email, discussion groups, blogs, nanoblogs or social networks, to mention the most important) for Pavlov, Melville, and Plice (2008) email viral marketing is the most powerful as it is the only method which spreads the message amongst groups of all kinds. The use of email continues to be one of the most common practices on the Internet: 95% of broadband users in the United States regularly check their mailbox and 88% do so daily (Riegner, 2007). In general, the success of this kind of practice is measured by the amount of forwarding achieved. According to Rigby (2004), recipients read many forwarded emails. In fact over 85% of emails are opened (including attached files or external links) merely because friends send them. Comparing these figures with opening or forwarding rates for SPAM emails (often blocked by the Internet connection's firewall) or from unknown sources, the difference is enormous, not to mention the negative attitudes which such mails can spark in recipients.

Beyond merely considering the means used, various studies have explored the social implications and factors related to the success of viral marketing campaigns (Allsop, Bassett, & Hoskins, 2007; Brodin, 2000; Coyle & Gould, 2002; Datta, Chowdhury, & Chakraborty, 2005; Dobele, Lindgreen, Beverland, Vanhamme, & Van Wijk, 2007; Gruen et al., 2006; Hennig-Thurau et al., 2004; Smith et al., 2007). The contributions of these works may be summed up in five groups: the features of the social network to which the individual belongs, the features of the message, the characteristics of the context and setting, the characteristics and motivation of sender and recipient. However, we pinpoint one area as yet unexplored and which may also impact the success of a viral campaign: the viral dynamics process.

3. Viral dynamics and determinants

Within the context of emails, in this study viral dynamics is defined as the process of receiving-opening-sending the viral message. The viral process commences with the individual receiving a message. Once individuals receive the message, they decide whether or not to open it, rejecting it on numerous occasions (DeBruyn & Lilien, 2008).

If recipients open the message, they then decide whether or not to forward it to their contacts. In this process, receipt of messages triggers the individual's action. The more often individuals receive messages, the greater is the volume of information available to the recipient and therefore the greater the likelihood that such information will be shared (forwarded) with others. In addition, actually opening the message acts as the mediating factor in the process. The greater the number of messages they open, the more likely individuals are to forward them. We therefore posit that

H1 The more often individuals receive viral messages, the more often they forward them (**H1a**). The frequency with which individuals open messages acts as a mediating factor in the process of receiving-sending messages (**H1b**).

3.1. Individuals' social networks and social capital

New information technologies have enabled individuals to create social networks, increasing their connections with others through email, mobile or online networks (Facebook, etc.). When individuals belong to these social networks they create social capital. Specifically, according to the SCT, social capital refers to the network of relationships an individual is involved in and the resources embedded therein (Bourdieu, 1986; Coleman, 1990; Nahapiet & Ghoshal, 1998). This social capital is measured through three dimensions (Nahapiet & Ghoshal, 1998): the structural dimension (the connections between individuals of a social group), the relational dimension (the willingness of people to act together), and the cognitive dimension (the degree to which individuals have a shared vision and language). This social capital influences the extent to which interpersonal knowledge sharing occurs (Chiu, Hsu, & Wang, 2006; Nahapiet & Ghoshal, 1998).

This research focuses on the network of communication formed using email and following this approach the study focuses on the first two dimensions to examine individuals' relations within their network of email contacts in terms of structure and relationships. As (Huang, Lin, and Lin (2009) argue, the cognitive dimension is irrelevant in this context as e-mail forwarding does not involve mutual discussion or collaboration behaviors.

3.1.1. Structural social capital

The structural social capital of the individuals in the email network is characterized by their position in the network. Kleijnen, Lievens, De Ruyter, and Wetzels (2009) put forward two structural network properties to assess a person's network position: individuals' connectedness and individuals' integration. An individual's connectedness refers to the degree to which the individual is linked to others in the network (Huang et al., 2009; Kleijnen et al., 2009), that is, the number of contacts the individual has. The individual's integration reflects the degree to which they communicate with others in the network (Kleijnen et al., 2009). In the case of email communication, this integration emerges as the intensity of communication through the email. In other words, individuals' structural social capital is formed by their number of contacts as well as the frequency with which they get in touch with other members of their email network.

These structural properties determine the viral process. According to the Social Network Theory (Granovetter, 1983), individuals are embedded in concrete, ongoing structures of social relations, and the extent of their embeddedness influences their individual behavior.

The accessibility and diversity of information consumers receive depend on their positions in the social networks (Granovetter, 1983; Kleijnen et al., 2009). Individuals' connectedness or number of contacts they maintain determines the flow of information they receive and send. With regard to this point, and for the case of social networks, Smith et al. (2007) state that a positive relation exists between the number of contacts the individual has and the amount of contributed content. The size and structure of the network have been linked to the likelihood that individuals will take part therein, an issue explored in studies such as Steyer, Garcia-Bardidia, and Quester (2007) and Kleijnen et al. (2009). Therefore,

H2 The greater the individual's connectedness in the email network, the greater the frequency with which they receive (**H2a**) and forward (**H2b**) viral messages.

The individual's integration in the network or frequency with which they contact other members of their network via email will impact the amount of information they receive, open and forward. Those who frequently interact with a wide range of people are more likely to exchange more information (Granovetter, 1983).

Individuals who receive a greater number of email messages are also more likely to receive a greater number of viral messages than other individuals. In addition, individuals who use email more often as a means of communication are also more likely to open or forward the viral messages they receive. As Ho and Dempsey (2010) point out, the consumption of online content will positively affect forwarding behavior. The longer that individuals spend online (in this case, using email), the more likely they are to open and forward information.

H3 The greater the individual's integration in the email network, the greater the frequency with which they receive (**H3a**), open (**H3b**) and forward (**H3c**) viral messages.

3.1.2. Relational social capital

Relational social capital, that is, the individual's relationship with the email network is measured as the strength or closeness of ties. The extent to which individuals maintain close ties with one another and the level to which these ties remain strong (referred to by authors such as DeBruyn and Lilien (2008) as strength ties or by Chan and Li (2010) as social bonds) impacts both the number of messages forwarded as well as the number received. Indeed, the relation amongst the members of a community is perceived as a major determinant of an individual's willingness to share knowledge. Brown et al. (2007) and DeBruyn and Lilien (2008) state that the strength of interpersonal ties is one of the most significant factors to account for the influence of WOM communications. Chiu et al. (2006) remind us that the fundamental proposition of the Social Capital Theory is that network ties provide access to resources. For the case of virtual communities, Chan and Li (2010) have evidenced that the social ties which consumers establish within the community determine their intent to behave in a reciprocal manner (sharing information in the same way they have received it). Coleman (Coleman, 1990) suggests that the strength of such ties can operate through trust. Indeed, trust is perceived as a key element in relations amongst individuals, shaping their intent to share information in online contexts (Chiu et al., 2006; Corritore, Kracher, & Wiedenbeck, 2003; Hsu, Ju, Yen, & Chang, 2007; Lu, Zhao, & Wang, 2010; Wu, Chen, & Chung, 2010; Wu & Tsang, 2007). The extent to which individuals trust one another will affect their willingness to engage in knowledge-sharing activities (Li, Hung, & Chen, 2009). When relationships amongst individuals are close and based on frequent contact and trust, their willingness to share information is greater since their expectations of benefiting from the interaction with other members of the virtual community increase (Hsu et al., 2007).

Close ties amongst a group of individuals also impact their intention to open the messages received. DeBruyn and Lilien (2008) indicate that when someone receives an email and considers opening it before knowing the subject of the message, the decision to open and read cannot relate to the message content but only to the relationship with the source. We therefore posit that:

H4 The greater the individual's relational social capital, the greater the frequency with which they receive (**H4a**), open (**H4b**) and forward (**H4c**) viral messages.

3.2. Attitudes toward viral messages

The Theory of Reasoned Action (Ajzen & Fishbein, 1980) is a widely adopted theoretical framework to model the influence of attitudes on behavior. According to the TRA, individuals' behavior is determined by previous intentions, while intentions are influenced by attitudes toward the behavior. These attitudes are the beliefs regarding the outcomes associated with a particular behavior and are generally measured as a favorable or unfavorable mind-set.

Based on the TRA, several authors have found positive and significant links between attitude and intention, and between intention and individuals' final behavior in an online context (Flynn & Goldsmith, 1993; Jones, Childers, & Kaufman-Scarborough, 2006; Klobas & Clyde, 2000; Pavlou, 2003; Shih, 2004). Based on the postulates of the TRA and on previous studies, in viral marketing dynamics individuals' intention to participate in the process is determined by their attitudes towards viral messages. Their belief regarding viral messages is a further motivational factor when opening and forwarding messages. For certain individuals, viral messages are a source of curiosity (Ho & Dempsey, 2010) and some even enjoy receiving them. According to Lewis, Phelps, and Raman (2005), in addition to the sender's name or the source, other factors which influence the decision to open viral messages are the message itself and the respondent's state of mind and context. Reasons for sending pass-along mail include the desire to amuse, inform, inspire, keep someone from being left out of a group, to help someone, to do a good deed, to comfort someone and to touch a person. Generally speaking, a positive attitude toward viral messages, in the sense of a positive predisposition toward them, will influence both the decision to open them and to forward them. Therefore,

H5 Individuals' attitude toward viral messages impacts their intention to open them (**H5a**) and forward them (**H5b**).

Fig. 1 shows a diagram of the proposed hypotheses:

4. Method and results

4.1. Sample and data collection

In order to conduct the empirical study, we gathered information through a questionnaire given to email users. We selected a homogeneous group to control demographic, social and psychological characteristics which might influence viral dynamics. Certain studies have shown that WOM or forwarding messages may be influenced by a similarity amongst members' characteristics, that is, individuals may be the same gender or be similar in terms of age, education, or lifestyle (Brown et al., 2007). They may also share a common language and values (Chiu et al., 2006), and a demographic similarity may exist (DeBruyn & Lilien, 2008). In an effort to pinpoint this homogeneity, the questionnaire was sent to undergraduate students enrolled in marketing courses. We thus obtained a sample of a specific demographic group: young adults. As previous researchers have proposed, young adults form the demographic group evidencing the highest rates of Internet adoption and with the highest penetration of viral marketing (Ho & Dempsey, 2010). They are the first to adopt any innovation related to the Internet (blogs, social networks, viral marketing, etc.) and use the Internet mainly as a tool for sharing information with family and friends. We obtained a final sample of 230 individuals. As for the composition of the sample, 41.5% were male and 58.5% female. 45.9% were aged between 18 and 20, 39.2% between 21 and 24, and 14.9% were over 25 years of age.

4.2. Measurement of variables

In order to measure the model variables, Likert scales were used. With regard to viral dynamics, we measured the frequency with which individuals receive, open and forward viral messages using three six-position indicators, where 1 indicates never, 2 hardly ever, 3 seldom, 4 fairly often, 5 very often, and 6 virtually every day.

We measured individuals' connectedness or size of the group with which they relate via email as the number of contacts included in the address book. For this, we used a four-point Likert scale, with the following values 1, less than 25, 2, between 25 and 50, 3, between 50 and 75, and 4, over 75. To determine individuals' integration, we used two 3-point scales measuring the average number of emails which individuals sent and received per day (1, less than 3, 2,

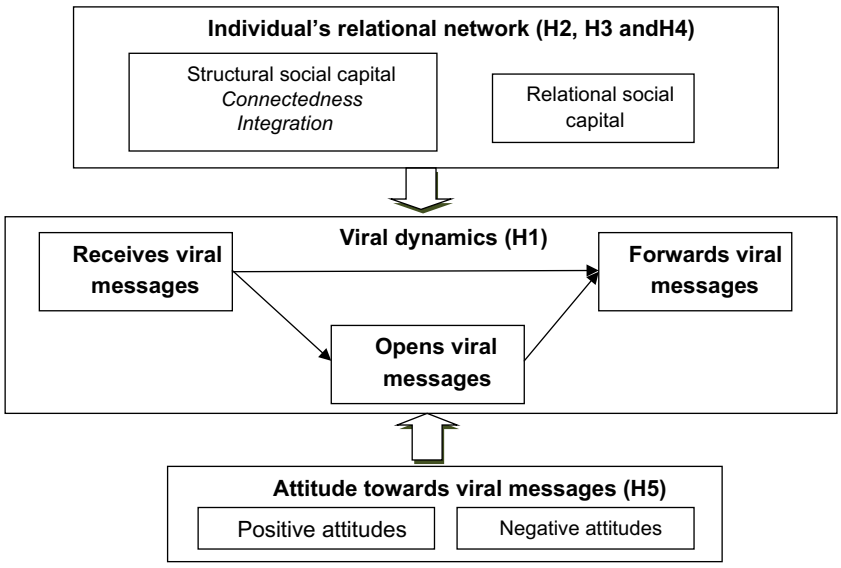

Fig. 1. Research model.

between 3 and 5, and 3 more than 5). We calculated individual integration as the multiplication of both items. We measured relational social capital by a five item semantic-differential scale, indicating the degree to which the relationship with most of their email contacts was close, frequent, trustful, friendly, and personal (Huang et al., 2009).

We measured attitude toward viral messages received on an eight indicator scale (five-point Likert scale) merging four positive and four negative reactions to viral messages on the basis of the proposals of Lewis et al. (2005) and Brown et al. (2007). Exploratory factorial analysis enabled us to ascertain that we could break down the scale into two factors, one containing a positive attitude toward viral messages and the other comprising negative attitudes, indicating that two sides to the same coin may not necessarily exist but that one individual may display both positive as well as negative feelings and attitudes towards viral messages.

To verify the convergent validity measuring relationship closeness and attitude towards viral marketing, we performed a confirmatory factor analysis (CFA). Although the chi-square statistic is significant – conceivably as a result of the size of the sample – the lambda values and the remaining goodness-of-fit indicators support the convergent validity of these scales ($\chi^2(61) = 110.68$ ($p = 0.00$); CFI = 0.97; RMSEA = 0.06; NFI = 0.95; GFI = .93; AGFI = 0.90). Finally, the extracted variance of each variable exceeds the value of its squared correlation with the other variables, justifying the discriminant validity of the scales (Anderson & Gerbing, 1988). Table 1 sums up the measures of all the variables and the descriptive statistics in greater detail, Table 2 showing the correlation matrix.

4.3. Model estimation

The next step in the analysis was to estimate the proposed model using a path analysis. We previously reduced the reflective scales to a factor. Table 3 shows the results of the estimation and Table 4 the indirect and total effects. The estimation provided a satisfactory fit to the data ($\chi^2(3) = 0.67$ ($p = 0.88$); CFI = 1.00; RMSEA = 0.00; NFI = 0.99; GFI = 0.99; AGFI = 0.99).

As the results show, not all the hypotheses proposed proved significant. As regards hypothesis 1, the dynamics of viral messages, the findings confirm that the frequency with which individuals receive messages has a positive impact on forwarding. Receiving a higher number of messages also impacts how often individuals opened them, which in turn influences the number of times individuals then forward messages. Receiving messages thus has a direct impact on subsequent forwarding and an indirect impact through such messages being opened. Since both the direct and indirect effect are positive and significant, we can affirm that opening viral messages exerts a partial mediation in the receiving-forwarding process (MacKinnon, Krull, & Lockwood, 2000).

Our findings fail to provide full empirical support for hypothesis 2. The individual's connectedness (measured as the number of contacts) impacts the frequency with which viral messages are either received. However, contrary to expectations, the impact of the individual's connectedness on forwarding viral messages is negative. As regards hypothesis 3, individuals who are more integrated (frequent use of email as a means of communication) also forward the greatest number of viral messages (hypothesis 3c). However, the effect of individuals' integration on the number of times they receive (hypothesis 3a) and open viral messages (hypothesis 3b) is not supported.

Hypothesis 4 is partially supported. Individuals' relational ties with their email contacts (relational social capital) do not influence how often viral messages are received (hypothesis 4a is thus rejected), but do impact the frequency with which they are opened and forwarded (hypothesis 4b and hypothesis 4c, respectively).

Finally, hypothesis 5 is also partially borne out. A positive attitude to viral messages is the main determinant of the frequency with which individuals open or forward these messages. Nevertheless, rejection of viral messages only has a negative impact on the frequency with which they are opened, but does not have a significant impact on how often they are forwarded.

5. Discussion

5.1. Theoretical implications

One key factor in the definition of viral marketing is the exponential growth and the pass-on of a marketing message to others. In this process to know how and why people engage in viral marketing is particularly relevant, in other words how individuals follow the process when they receive a viral email message and what kind of factors influence their forwarding intentions.

In the current work, the viral dynamics process is defined as the receiving-opening-forwarding path for viral messages. Findings show that the more often individuals receive viral messages, the

Table 1
Summary of measurement scales.

	Mean	Std deviation	Lambda
Viral dynamics			
Frequency with which viral messages are received (RVM)	4.68	1.38	–
Frequency with which viral messages are opened (OVM)	2.48	1.53	–
Frequency with which viral messages are forwarded (FVM)	2.55	0.97	–
Structural social capital (SSC)			
Number of email contacts (SSC-connectedness)	3.09	1.02	–
Number of emails sent (SSC-integration)	1.16	0.44	–
Number of emails received (SSC-integration)	1.87	0.80	–
Relational social capital (RSC) (AVE = 0.594)			
Occasional/Close	3.69	1.18	0.631
Sporadic/Frequent	3.61	1.17	0.654
Not very trustworthy/Highly trustworthy	3.74	0.99	0.912
Not a close friend/A close fiend	3.67	0.95	0.892
Impersonal/Personal	3.56	1.00	0.720
Positive attitude towards viral messages (PA) (AVE = 0.680)			
Receiving viral messages			
Is a pleasant experience	2.41	1.08	0.823
Makes me feel happy that people remember me	2.36	1.13	0.793
Inspires a feeling of curiosity and a desire to see what it contains	2.64	1.07	0.840
Is pleasant as it affords me an opportunity to relax a little	2.29	1.11	0.850
Negative attitude towards viral messages (NA) (AVE = 0.507)			
They hold no interest for me	3.23	1.38	0.637
Having to devote so much time to my email annoys me	3.28	1.28	0.779
I am too busy and don't have time to read all the messages	3.53	1.24	0.681
I am annoyed at being included in the lists which receive these kinds of messages	3.40	1.31	0.774

Table 2
Correlation matrix.

	SSC-connectedness	*SSC-integration*	*RSC*	*PA*	*NA*	*RVM*	*OVM*
SSC-integration	0.291						
RSC	−0.053	0.071					
PA	−0.116	0.060	0.121				
NA	0.116	−0.071	−0.038	−0.343			
RVM	0.101	0.133	0.080	0.009	0.001		
OVM	−0.049	0.137	0.193	0.606	−0.343	0.191	
FVM	−0.114	0.209	0.244	0.391	−0.218	0.203	0.515

Table 3
Estimation of the proposed hypotheses.

Independent variables	Dependent variables		
	RVM	OVM	FVM
SSC-connectedness	0.099*	–	−0.152**
SSC-integration	0.033	0.075	0.197***
RSC	0.079	0.107*	0.135**
PA	–	0.535***	0.157**
NA	–	−0.153***	−0.023
RVM	–	0.156***	0.159*
OVM	–	–	0.313***
R^2	0.02	0.435	0.367

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$ (one-tailed test)

more they send viral messages onto others. Additionally, this process is reinforced if subjects frequently open these messages. If opening viral messages thus plays a mediating role in the dynamics of viral marketing, we should explore which factors contribute to individuals' actually opening the messages.

On the basis of the SCT and the TRA, the findings confirm that the viral dynamics process is driven by both individuals' social capital in the email network and their attitudes.

First, the structural dimension of social capital as the individual's connectedness in the group of email contacts has a weak impact on viral dynamics. Forming part of a wider network of email contacts seems to impact the frequency with which messages are received. In addition, the wider the email network, the less frequently the individual forwards viral messages. However, the individual's integration in the email network (the number of emails individuals sent and received) proves critical to the

Table 4
Indirect and total effects.

		SSC-connectedness	SSC-integration	RSC	PA	NA	RVM
Indirect effects	OVM	0.015	0.005	0.012			
	FVM	0.021	0.030	0.050*	0.167***	−0.048**	0.049****
Total effects	OVM	0.015	0.081	0.119**	0.535***	−0.153**	0.156***
	FVM	−0.131*	0.228***	0.185***	0.325*****	−0.071	0.208***

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$ (one-tailed test).

individual involved in the forwarding process. These results suggest the idea that large networks increase the flow of information whereas the degree of individual integration in the network increases the communication and exchange of information.

Secondly, results support the idea that individuals' social capital, in its relational dimension, influences both the opening and forwarding of viral messages. The strength ties between individuals and the members of their email group are essential to foster the dynamics of viral marketing. DeBruyn and Lilien (2008) found similar results when analyzing the relationships between individuals and opening emails. In the case of virtual communities, Chiu et al. (2006) also evidence that the degree of trust, reciprocity and identification between individuals in a community determines knowledge sharing.

Thirdly, attitudinal factors constitute a second group of determinants vis-à-vis the opening and forwarding of viral messages. When individuals feel curiosity towards the message and associate it with a relaxing or pleasant moment, they are more likely to open it and forward it. By contrast, when the viral message holds no interest and when even simply receiving it proves annoying, individuals are unlikely to open it. Nevertheless, negative feelings or a sense of rejection towards the message received have no impact on the intention to forward it.

Finally, as a theoretical implication of this research, this study concludes that SCT proves adequate to explain individuals' behavior regarding forwarding viral messages whereas the TRA provides a better explanation of individuals' intention of opening viral messages. The process of receiving-forwarding is mainly determined by the individual's position and relations in the network. Opening, by contrast, does not depend on the network characteristics but on the individual's attitudes toward the viral messages.

5.2. Managerial implications

Viral marketing seems to make sense. As Kirby and Marsden (2006) indicate, viral marketing – especially when used as an integrated rather than isolated approach – can both improve brand advocacy and increase mass-market brand awareness, all at an infinitely lower cost than conventional media campaigns. In fact, the consumers themselves act as the means of passing on the message and who therefore bear the cost – in the case of emails, entailing very little effort in terms of time and money –, the message thus reaching those individuals (friends, family, classmates and workmates or acquaintances in general) selected from the list of contacts. This implies that, because of the ties with the sender, the person receiving the message is more willing to open it, much more so than if the message were to come from an unknown source.

Being a reliable as well as inexpensive channel of communication is more than sufficient justification to consider this kind of practice highly beneficial for organizations wishing to reach their target public, a public devoting an increasing amount of time to online compared to offline media. Added to the fact that the scale of the campaign may be virtually limitless makes this a highly appealing option, although one which is by no means risk free.

However, for viral marketing to prove effective the messages must be viral, in other words individuals who receive the messages must be willing to open and forward them. In this sense, individuals with the best connections, those maintaining the closest links with their group, are ideally placed to receive this kind of message as they are the most willing to subsequently forward it. As firms seek to reach the widest possible number of people, the target public in viral campaigns should be those who are well connected with their environment or who are more integrated in communities or social groups. They need not necessarily be those with the greatest number of contacts or social acquaintances, but rather those who belong to close-knit and well-connected groups. One way of achieving this information may be by merely observing the public information and activities of the users in the various networks in which they are involved. It is also necessary to pinpoint the public who are likely to be the most receptive to viral messages and, in general, it is important to secure a positive attitude towards the message received or at least to ensure that it is not perceived as something intrusive. For instance, Lee, Lee, and Sanford (2010) observe that individuals with a high level of self-concept clarity tend not to comply with product or service recommendations, irrespective of their perceived level of risk or purchase-decision involvement. Therefore, a good way to achieve a positive attitude towa rds the messages is by trying to make the message relevant to the recipient. Those who are to act as the "centers of infection" need to be chosen extremely well if they are to infect their contacts (if, for instance, they are clients of the company, by sending them messages about products they have consumed or in which they have at some time shown an interest).

There is also a need to ensure the creativity of the message and the format as a means of arousing the recipient's curiosity. The danger of using undifferentiated messages is the possible annoyance or nuisance these messages may cause to the recipient and which may bring the dynamics of the viral process to a halt, or even worse, lead to a negative eWOM which might seriously harm the image of the firm in question. In sum, although the necessary investment in financial terms does not at first sight appear to be very high, what firms must do is to devote time and effort to understanding this phenomenon and how to develop it.

5.3. Limitations and further research

The present research is by no means without its limitations. Firstly, we use a convenience sample, which to a certain extent restricts the generalization of the findings. Nevertheless, as pointed out, youngsters constitute an ideal group for assessing phenomena related to Internet based information and communication (Gallagher, Foster, & Parsons, 2001a, 2001b). Yet, it would be advisable to project the model with other samples that are representative of other segments of the population in order to verify that the proposed model does in fact work. Secondly, the study is restricted to viral messages sent by email. Other means widely used amongst youngsters to share information such as social networks and the mobile phone have been omitted from the study. Likewise, a further drawback is that the study is conducted using surveys as a source of information. Experimental studies may provide a clearer picture of the process which individuals follow in specific situations where they receive and forward viral messages.

With regard to future lines of research, in the marketing viral context numerous questions still remain to be dealt with. In the light of the research work carried out and the findings to emerge, the question arises as to which individuals display the closest relational ties through the Internet and who therefore would be more inclined to become involved in viral marketing. This characterization would not only be restricted to socio-demographic aspects but also to the individual's relation with the means in question, in other words whether for these people the email is basically a work tool or is also related to leisure and keeping in touch and communicating with those around. Other major issues which remain to be explored relate to analyzing which design aspects of the message and the answer expected from the recipient (merely forwarding or some kind of action or interaction) generate a more positive attitude toward the viral message and what incentives might be used to encourage forwarding thereof.

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References

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Allsop, D. T., Bassett, B. R., & Hoskins, J. A. (2007). Word-of-Mouth research: Principles and applications. *Journal of Advertising Research* (December), 398–411.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice. A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411–423.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). New York: Greenwood.

Brodin, O. (2000). Les communautés virtuelles: Un potentiel marketing encore peu explore. *Décisions Marketing, 21*, 47–56 (September–December).

Brown, J., Broderick, A. J., & Lee, N. (2007). Word of mouth communication within online communities: Conceptualizing the online social network. *Journal of Interactive Marketing, 21*(3), 2–20.

Brown, J. J., & Reingen, P. H. (1987). Social ties and Word-of-Mouth referral behavior. *Journal of Consumer Research, 14*(3), 350–362.

Chan, K. W., & Li, S. Y. (2010). Understanding consumer-to-consumer interactions in virtual communities: The salience of reciprocity. *Journal of Business Research, 63*(9/10), 1033–1040.

Cheung, M., Anitsal, M. M., & Anitsal, I. (2007). Revisiting Word-of-Mouth Communications: A cross-national exploration. *Journal of Marketing Theory and Practice, 15*(3), 235–250.

Chiu, C. M., Hsu, M. H., & Wang, E. T. G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems, 42*(3), 1872–1888.

Coleman, J. S. (1990). *Foundations of social theory*. Cambridge, MA: Belknap/Harvard University Press.

Corritore, C. L., Kracher, B., & Wiedenbeck, S. (2003). On-line trust: Concepts, evolving themes, a model. *International Journal of Human–Computer Studies, 58*(6), 737–758.

Coyle, J. R., & Gould, S. J. (2002). How consumers generate clickstreams through Web sites: An empirical investigation of hypertext, schema, and mapping theoretical explanations. *Journal of Interactive Advertising;, 2*(2). http://www.jiad.org.

Datta, P. R., Chowdhury, D. N., & Chakraborty, B. R. (2005). Viral marketing: New form of word-of-mouth through Internet. *The Business Review, 3*(2), 69–75.

DeBruyn, A., & Lilien, G. A. (2009). Multi-stage model of word of mouth through electronic referrals, *eBusiness Research Center Working Paper*. <http://www.smeal.psu.edu/cdt/ebrcpubs/res_papers/2004_02.pdf/> Accessed October 2009.

DeBruyn, A., & Lilien, G. (2008). A multi-stage model of word-of-mouth influence through viral marketing. *International Journal of Research in Marketing;, 25*(3), 151–163.

Dobele, A., Lindgreen, A., Beverland, M., Vanhamme, J., & Van Wijk, R. (2007). Why pass on viral messages? Because they connect emotionally. *Business Horizons, 50*, 291–304.

East, R. (2005). The impact of positive and negative word of mouth on brand choice. *ANZMAC 2005 Conference: Advertising/Marketing Communication Issues*; <http://smib.vuw.ac.nz:8081/WWW/ANZMAC2005/cd-site/pdfs/1-Advertising/1-East.pdf> Accessed on September 2009.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley Publishing Company.

Flynn, L. R., & Goldsmith, R. E. (1993). Application of the personal involvement inventory in marketing. *Psychology & Marketing, 10*(4), 357–366.

Gallagher, K., Foster, K. D., & Parsons, J. (2001a). A tale of two studies: Replicating advertising effectiveness and content evaluation in print on the Web. *Journal of Advertising Research, 41*(4), 71–81.

Gallagher, K., Foster, K. D., & Parsons, J. (2001b). The medium is not the message: Advertising effectiveness and content evaluation in print and on the Web. *Journal of Advertising Research, 41*(4), 57–70.

Gershoff, A. D., Broniarczyk, S. M., & West, P. M. (2001). Recommendation or evaluation? Task sensitivity in information source selection. *Journal of Consumer Research, 28*(12), 418–438.

Granovetter, M. (1983). The strength of weak ties: A network theory revisited. *Sociological Theory, 201–233*.

Gruen, T. W., Osmonbekov, T., & Czaplewski, A. J. (2006). EWOM: The impact of customer-to-customer online know-how exchange on customer value and loyalty. *Journal of Business Research, 59*(4), 449–456.

Guadagno, R. E., & Cialdini, R. B. (2005). Online persuasion and compliance: Social influence on the Internet and beyond. In Y. Amichai-Hambuerger (Ed.), *The social Net: The social psychology of the Internet* (pp. 9–13). New York: Oxford Press.

Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the Internet. *Journal of Interactive Marketing, 18*(1), 38–52.

Ho, J. Y. C., & Dempsey, M. (2010). Viral marketing: Motivations to forward online content. *Journal of Business Research, 63*(9/10), 1000–1006.

Hsu, M. H., Ju, T. L., Yen, C. H., & Chang, C. M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human–Computer Studies, 65*, 153–169.

Huang, C. C., Lin, T. C., & Lin, K. J. (2009). Factors affecting pass-along email intentions PAEIs: Integrating the social capital and social cognition theories. *Electronic Commerce Research and Applications, 8*(3), 160–169.

Jones, W. J., Childers, T. L. & Kaufman-Scarborough, C. (2006), Hedonic and utilitarian dimensions of online retail shopping behavior: Does disability matter? In *American Marketing Association. Conference Proceedings*, Chicago.

Kirby, J., & Marsden, P. (2006). *Connected marketing: The viral, buzz and word of mouth revolution*. Great Britain: Butterworth-Heinemann.

Kleijnen, M., Lievens, A., De Ruyter, K., & Wetzels, M. (2009). Knowledge creation through mobile social networks and its impact on intentions to use innovative mobile services. *Journal of Service Research, 12*(1), 15–35.

Klobas, J. E., & Clyde, L. (2000). Adults learning to use the Internet: A longitudinal study of attitudes and other factors with intended Internet use. *Library and Information Science, 22*(1), 5–34.

Knight, C. M. (1999). Viral marketing–defy traditional methods for hyper growth. *Broadwatch Magazine, 13*(11), 50–53.

Lee, G., Lee, J., & Sanford, C. (2010). The roles of self-concept clarity and psychological reactance in compliance with product and service recommendations. *Computers in Human Behavior, 26*(6), 1481–1487.

Lewis, R., Phelps, J. E., & Raman, N. (2005). Understanding pass-along emails: Motivations and behaviors of viral consumers. In C. P. Haugtvedt, K. A. Machleit, & R. F. Yalch (Eds.), *Online Consumer Psychology. Understanding and influencing consumer behavior in the virtual world* (pp. 63–99). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Li, M. J. J., Hung, S. W., & Chen, C. J. (2009). Fostering the determinants of knowledge sharing in professional virtual communities. *Computers in Human Behavior, 25*, 929–939.

Litvin, S. W., Goldsmith, R. E., & Pan, B. (2008). Electronic word-of-mouth in hospitality and tourism management. *Tourism Management, 29*(2), 458–468.

Lu, Y., Zhao, L., & Wang, B. (2010). From virtual community members to C2C e-commerce buyers: Trust in virtual communities and its effect on consumers' purchase intention. *Electronic Commerce Research and Applications, 9*(4), 346–360.

MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science, 1*(4), 173–181.

Modzelewski, M. (2000), Finding a cure for viral marketing, *Direct Marketing News*. 2000-09-11.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *The Academy of Management Review, 23*(2), 242–266.

Nail, J. (2005). What's the buzz on worth-of-mouth marketing? Social computing and consumer control put momentum into viral marketing, *Forrester Research*. <http://www.forrester.com/Research/Document/Excerpt/0,7211,36916,00.html> Accessed September 2009.

Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce, 7*, 69–103.

Pavlov, O. V., Melville, N. P., & Plice, R. K. (2008). Toward a sustainable email marketing infrastructure. *Journal of Business Research, 61*(11), 1191–1199.

Phelps, J. E., Lewis, R., Mobilio, L., Perry, D., & Raman, N. (2004). Viral marketing or electronic word-of-mouth advertising: Examining consumer responses and motivations to pass along email. *Journal of Advertising Research, 44*(4), 333–348.

Porter, L., & Golan, G. J. (2006). From subservient chickens to brawny men: A comparison of viral advertising to television advertising. *Journal of Interactive Advertising, 6*(2), 30–38.

Riegner, C. (2007). Word of mouth on the web: The impact of web 2.0 on consumer purchase decisions. *Journal of Advertisement Research, 47*, 436–447.

Rigby, E. (2004). The revolution masterclass on viral marketing, *Revolution Magazine*. <http://www.revolutionmagazine.com/news/217975/> Accessed October 2009.

Rosen, E. (2000). *The anatomy of buzz: How to create word-of-mouth marketing*. New York: Doubleday.

Shih, H.-P. (2004). An empirical study on predicting user acceptance of e-shopping on the Web. *Information & Management, 41*(3), 351–368.

Smith, T., Coyle, J. R., Lightfoot, E., & Scott, A. (2007). Reconsidering models of influence: The relationship between consumer social networks and word-of-mouth effectiveness. *Journal of Advertising Research, 47*(4), 387–397.

Steyer, A., Garcia-Bardidia, R., & Quester, P. (2007). Modélisation de la structure sociale des groupes de discussion sur Internet: Implications pour le contrôle du marketing viral. *Recherche et Applications en Marketing, 22*(3), 29–44.

Sussan, F. (2005). The added value of online word-of-mouth (eWOM) to advertising in new product adoption: An empirical analysis of the movie industry. *Doctoral Dissertation (e-Thesis)*.

Vilpponen, A., Winter, S., & Sundqvist, S. (2006). Electronic word-of-mouth in online environments: Exploring referral network structure and adoption behavior. *Journal of Interactive Advertising, 6*(2). http://www.jiad.org/article82.

Wangenheim, F., & Bayón, T. (2004). The effects of word of mouth services switching. *European Journal of Marketing, 38*(9/10), 1173–1185.
Wu, J. J., Chen, Y. H., & Chung, Y. S. (2010). Trust factors influencing virtual community members: A study of transaction communities. *Journal of Business Research, 63*(9/10), 1025–1032.
Wu, J. J., & Tsang, A. S. L. (2007). Factors affecting members' trust belief and behaviour intention in virtual communities. *Behaviour & Information Technology, 27*(2), 115–125.
Xia, L., & Bechwati, N. N. (2008). Word of mouse: The role of cognitive personalization in online consumer reviews. *Journal of Interactive Advertising, 9*(1), 1–10. http://www.jiad.org/article105.