



## The Firm's Management of Social Interactions

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### *Abstract*

Consumer choice is influenced in a direct and meaningful way by the actions taken by others. These “actions” range from face-to-face recommendations from a friend to the passive observation of what a stranger is wearing. We refer to the set of such contexts as “social interactions” (SI). We believe that at least some of the SI effects are partially within the firm’s control and that this represents an exciting research opportunity. We present an agenda that identifies a list of unanswered questions of potential interest to both researchers and managers.

In order to appreciate the firm’s choices with respect to its management of SI, it is important to first evaluate where we are in terms of understanding the phenomena themselves. We highlight five questions in this regard: (1) What are the antecedents of word of mouth (WOM)? (2) How does the transmission of positive WOM differ from that of negative WOM? (3) How does online WOM differ from offline WOM? (4) What is the impact of WOM? (5) How can we measure WOM? Finally, we identify and discuss four principal, non-mutually exclusive, roles that the firm might play: (1) observer, (2) moderator, (3) mediator, and (4) participant.

Consumer choice is influenced in a direct and meaningful way by the actions taken by others. These actions range from face-to-face recommendations from a friend to the passive observation of what a stranger is wearing. In this paper, we argue that the centrality of such influences has not been matched by the attention of researchers; and that more research needs to be done in this area. To spur such research, we present an agenda that identifies a list of unanswered questions that are likely to be of interest to both researchers and managers. Our objective is to discuss and analyze the firm's role in managing these influences.

The paper is organized as follows. In Section 1, we clarify the boundaries of the phenomenon under investigation. Given the similarities between traditional face-to-face word of mouth (WOM) and other forms of influence, we argue for a broad definition of "social interactions" (SIs) which we maintain throughout the paper. In Section 2, we present evidence that not only are SIs important but that they are also growing in importance vis-à-vis other influences on consumer decisions. In Section 3, we pose a set of strikingly simple and straightforward (but as yet unanswered) questions regarding our understanding of the phenomena. In Section 4, we discuss the firm's role in managing SIs. This fundamental question has until recently been virtually ignored in the management literature. We discuss four key non-mutually exclusive, roles that the firm might play: (1) observer, (2) moderator, (3) mediator, and (4) participant. Recognizing that our questions may be difficult to answer, in Section 5 we review three recent methodological developments that may help researchers address the inherent complexities.

## 1. What are We Talking About?

Even a cursory reading of the literature reveals that the boundaries around the definition of WOM are, at best, ambiguous. While, to our knowledge, not defined formally anywhere, we might conceptualize "traditional WOM" as the one-to-one and face-to-face exchange of information about a product or service. This is the narrowest definition of the phenomenon, though it is closest in spirit to what was conceptualized by Granovetter (1973) as well as by Katz and Lazarsfeld (1955). Slightly broadening this would allow us to also capture the one-to-one WOM that has been enabled by recent technological developments like email and mobile communication. However, even this would leave out a great deal of interpersonal influence. For example, it ignores *observation* of others' actions. Moreover, information exchanged in online communities (Godes and Mayzlin, 2004; Mayzlin, 2004; Kozinets, 2002; Dellarocas, 2004; Chen and Xie, 2004; Das and Chen, 2004) shares many common features with traditional WOM though it is both anonymous and one-to-many in nature. The use of "reference accounts" in business markets shares with WOM the quality that information about one customer's experiences are possibly influential in another's decision.

For all of their differences, each of these examples represents a context in which one's expected utility for specific choice alternatives is affected by the actions taken by others. Since the traditional view of WOM is too narrow to capture the breadth of influences, we refer them as "social interactions" (SIs). This term is intentionally general, capturing as it does a wide and heterogeneous set of contexts.<sup>1</sup> We define a SI as an action or actions that (a) is taken by an individual not actively engaged in selling the product or service and that

(b) impacts others' expected utility for that product or service. To clarify the SI concept, it is useful to discuss three essential facets of any social interaction: *channel*, *content* and *impact*. The *channel* is the medium through which the influence takes place. This might be face-to-face discussion, for example. Important dimensions that differentiate various channels include: credibility, number of recipients, and whether or not the channel is mediated by a third party. The *content* is the information that is transmitted over this channel. Important dimensions of the content include its objectivity and valence. *Impact* represents the ultimate effect of others' actions. We discuss the impact of SIs in more depth below in Section 3.3.

## 2. Why Social Interactions? Why Now?

Both academics and managers have been interested in interpersonal communication for the better part of the last century. Recent trends have increased this attention. Consumers' judgments of the usefulness of advertising has declined over time and is now deemed to be lower than WOM.<sup>2</sup> There are many possible explanations for the increasing importance of WOM. We distinguish below factors that have resulted in a *need* for more WOM—"demand-side factors"—and those that have resulted in the *ceteris paribus existence* of more WOM ("supply-side factors").

### 2.1. Demand-Side Factors

Products have become *increasingly complex*. While the number of attributes associated with even the most mundane products exploded, the average consumer's ability to evaluate these product features has diminished as the attributes become more "technical" in nature. In addition to product complexity, the economics of information provision—particularly via the Internet—has resulted in an explosion of available information. Finally, traditional media are perceived to have become *less reliable* as sources of information. As a result, consumers look increasingly to each other in order to simplify information processing and to focus on what's important.

### 2.2. Supply-Side Factors

Several developments have increased the volume of interpersonal communication. The first has been the expansion in the number and forms of *decentralized communication*. Just ten years ago, most such communication took place in person or over the phone. Today, billions of people communicate via email and other Internet-based media, SMS (text messaging) and mobile telephony. As a result, information may diffuse more quickly. Note that this is simply potential. The decision as to whether to pass on a piece of information still lies with the person. This expansion in communication channels also means that consumers receive more information. Thus, it is not clear that *every* piece of information will diffuse faster today than it did in 1994. In fact, less-compelling news might be "crowded out" and travel more slowly. Along with the expansion of channels of interpersonal communication has come a

*decrease in the cost* of using them. A piece of information can be transmitted nearly instantly and cheaply to hundreds of your closest friends via text message or e-mail. Finally, it has become easier to *aggregate interpersonal communication*. Rottentomatoes.com, a database of movie critics' reviews, allows interested moviegoers to instantly review more than one hundred critics' opinions on a film. The site's forums make available the aggregated views of moviegoers on the critics' opinions.

### 3. Understanding the Phenomenon

To appreciate the firm's choices with respect to managing SIs, it is important to evaluate where we are in terms of understanding the phenomena. We highlight five questions: (1) What are the antecedents of SIs? (2) Do negative SIs differ from positive SIs? (3) How do online SIs differ from offline SIs? (4) What is the impact of SIs? (5) How should we measure SIs?

#### 3.1. What are the Antecedents of Social Interactions?

A fundamental difference between information received from the firm and information received from another consumer is that the latter is typically free of bias born of the desire for a sale. However, this does not mean that the sender's motivation is irrelevant to the recipient. On the contrary, there are a number of potential motivations spurring someone to transmit information that, if known, would imply some level of discounting by the recipient. Thus, the eventual impact is moderated by the sender's level and source of motivation. The motivation to transmit information can be further dichotomized into *intrinsic* and *extrinsic* motivations. Moreover, intrinsic motivations are likely to differ across different consumer types. The marketing literature discusses several types of consumers who are more likely to disseminate information: opinion leaders, early adopters and market mavens (see Feick and Price, 1987). More research is needed to investigate the fundamental motives behind the individual's proclivity for communication as a function of the individuals' characteristics.

The opinion leader designation has been a long accepted concept in the marketing literature (Katz and Lazarsfeld, 1955; King and Summers, 1996). However, little is known about what motivates the opinion leader. Exceptions include Jacoby and Hoyer (1981) and Wojnicki and Godes (2004). Moreover, what is needed is a broader investigation of intrinsic motivation beyond simply the opinion leader. Godes and Mayzlin (2004) have shown that opinion leaders may not always play a primary role in dissemination. Similarly, the specific motivations of early adopters (Rogers, 1994; Chen and Xie, 2004) need further study: early adopters have an information advantage, but what motivates them to share it with others?

Another type of information disseminator is a market maven (Feick and Price, 1987)—an individual whose information spans product categories and who is likely to diffuse this information widely. Feick and Price (1987) suggest that a market maven may use her knowledge to enhance her power in society. Recently, Phelps and Mobilio (2004) provide focus group evidence that "viral mavens" passed along emails in a desire to connect and share with others. Clark and Goldsmith (2005) find that market mavens have a need for

uniqueness which they express through brands. Ozcan (2004) suggests that word of mouth should be seen in the context of a dialogue between two parties: the sender and the receiver.

Another important individual-level dimension is the structure of one's network and the role the actor plays in it. While the popular press has discussed this—Gladwell's (2000) "connectors," Rosen's (2000) "network hubs"—the marketing literature has been relatively silent about these factors. The lay theory is that some people are simply connected to many others and are therefore likely to play an important role in the spread of information. However, this raises many questions: Why do their networks differ? Do they use their networks for different purposes? Why would they spread information to others in their network? What are the differences in motivations across opinion leaders, innovators and connectors?

One may also consider *extrinsic motivation*. How do people react to the incentive to disseminate information? Even though "shilling" has been practiced for centuries, there has been very little research to investigate this important question. Verlegh (2004) begins to shed light on the issue in an investigation of the recipient's inference about the credibility of WOM as a function of the sender's incentives. This is but a first step. One needs to understand better the response function to various types of incentives such as monetary incentives, discount-based incentives (Chen and Shi, 2004) and/or recognition-based incentives.

### 3.2. *Do Negative Social Interactions Differ from Positive Social Interactions?*

We think about the valence of a SI as being captured in the impact on the recipient's expected value following the encounter. Anderson (1998), for example shows that negative WOM is more extreme than positive WOM. However, beyond this study, we have little sense of how—not to mention why—positive and negative SIs differ. Are they generated by different types of people? Is the "pass along rate" the same or different? Based in part on incorrect inferences drawn from a study done by the TARP research company (Goodman, 1999), there is a belief that one is significantly more likely to pass along negative news than positive news. However, this project was focused on understanding the likelihood that one would *encounter* positive vs. negative news, not *pass along* such news. Thus, one cannot conclude from this that one is more or less likely to pass on positive or negative news since it is confounded by the likelihood that one *has* positive or negative news. More rigorous research into the relative probabilities of transmission of positive and negative information would be valuable for both academics and managers. One step in this direction has been taken by Wojnicki and Godes (2004) in an analysis of individual-level differences. These authors show that category experts seem to pass along more positive (than negative) news, but the same is not true of novices. A more-general theory of what information is passed along, when (situational factors), and by whom (individual factors) would have significant value.

Positive and negative SIs are likely to differ along other dimensions, including their potential impact. A simple Bayesian model would imply that the impact of "positive" and "negative" news on the posterior belief would be a function of the prior belief and the accuracy of the signal. Whether this holds in practice is an empirical question worthy of

study. Moreover, there is reason to believe that negative information may appear *more credible* than positive information (see Chevalier and Mayzlin (2004)).<sup>3</sup>

### 3.3. *How Do Online SIs Differ from Offline SIs?*

We argue above that the Internet has enabled new forms of interpersonal communication. Most important, perhaps, is the rich set of data that online communities offer the empirical researcher. However, one must be cautious about using these data to study broader social interactions. It is important to consider any implicit assumptions being made. Is one assuming that the volume, valence and content of online SIs are a proxy for their offline analogs? *Should* one do so? Some aspects of online SIs might be reasonable measures of the offline world (e.g., a movie being talked about at the water cooler may also be the one being talked about in the average online community). However, the proportions of positive to negative information about a given movie being transmitted in on- and off-line SIs may not be similar. With fundamental differences between online and offline SIs (e.g., anonymity and speed of diffusion) understanding the relationship between these two forms of SI is a fertile research area. When and how are they related? When are they proxies for one another? When might they have a causal relationship vs. simply being the correlated outcomes of a single unobservable source?

### 3.4. *What is the Impact of SIs?*

Perhaps the most fundamental assumption behind our interest in SIs is that they drive behavior. Nonetheless, the veracity of this assumption remains largely untested. The principal impediment to such inquiry has traditionally been a lack of data. Two solutions to this problem have been proposed with varying degrees of success. One is to not collect SI data at all, and instead, *infer* their existence and impact.<sup>4</sup> For example, Bass (1969) specifies the relationship between past sales and future sales, assuming that the relationship is partially caused by SI's (see also Foster and Rosenzweig, 1995; Kaplan et al., 1997; Garber et al., 2004). A second solution is to use online SI data directly. Godes and Mayzlin (2004) investigate the relationship between TV ratings and discussion in usenet forums; Chevalier and Mayzlin (2004) look at the effect of online customer book reviews on the book's relative rankings on Amazon and Barnes and Noble.com; Dellarocas et al. (2004) use online consumer movie reviews to forecast movie revenues; and Kozinets (2002) uses online communities as the basis for ethnographies.

On one hand, these studies support the belief that SIs matter. However, we have little sense for either the *nature* of these social interactions or the mechanism(s) behind their impact. Foster and Rosenzweig (1995), for example, are unable to determine whether it was observation that led to the diffusion or whether there was actual interpersonal discussion. Give that both were likely, how did they interact? Which had the dominant effect? Similarly, Godes and Mayzlin (2004) are unable to determine whether it was the online conversations that led to certain shows' success or whether these conversations were proxies for offline conversations. One obstacle to understanding the process is the

difficulty of analyzing communication content (see Section 3.4). Lab studies where researchers can control and manipulate various aspects of the process are promising here (Verlegh et al., 2004).

Our understanding of the *underlying mechanism* is even less developed. Do SIs increase the likelihood that the focal product will be in the consideration set or, on the other hand, is the bigger impact on the likelihood of being selected from the set? Do SIs have a bigger impact on the provision of new ideas or on the credibility one places on held beliefs? These are among the set of questions that need research.

### 3.5. How Should We Measure SIs?

It is hard to imagine a firm using as a weapon something whose effects that it cannot measure. Nonetheless, unlike traditional media, SIs currently lack an accepted set of assessment metrics. Returning to our discussion of the facets of SI—channel, content and impact—one may focus a measurement strategy at three conceptual stages. The first, and least complicated, is a channel approach: what is the nature of SI in a specific channel? Thus, how many people are talking about a specific brand in an online community? Godes and Mayzlin (2004) point out that this approach may be misleading and suggest that a more meaningful measure of SI impact might be the “dispersion” of conversations across social networks (Granovetter, 1973; Burt, 1992). Although a channel-based measurement approach is conceptually feasible, generally-accepted and theoretically-sound measures have yet to be developed.

A second, more complex approach is content-based. Das and Chen (2004) propose a sophisticated multi-model method and find encouraging results on the value of content measurement. The main hurdles here are data collection and analysis. Unless one is focused solely on online SIs, it is very difficult to capture the content of an exchange (e.g., a verbal interaction). Much research is needed to enhance our ability to process content precisely and meaningfully. Models that classify content based on valence particularly important for meaningful content analysis.

Finally, one might also measure the impact of SIs, although such studies are rare. Compared to traditional media, SIs do not lend themselves well to such study. Since interpersonal interactions occur stochastically (and often out of view) it may be difficult to assess their impact in a rigorous way (see Godes and Mayzlin (2004)).

## 4. The Firm's Management of SIs

Despite the importance of SIs, little research has been done on how firms may potentially use and impact them. This represents an exciting research opportunity. We propose a framework that represents four generic (non-mutually exclusive) strategies that the firm might implement in managing SIs (see Figure 1). Ordered from most passive to most aggressive, these are: (1) *Observer*: The firm simply collects SI information to learn about its ecosystem; (2) *Moderator*: The firm *fosters* SIs; (3) *Mediator*: The firm actively *manages* SIs; and (4) *Participant*: In this most-aggressive role, the firm plays a role in the SIs.

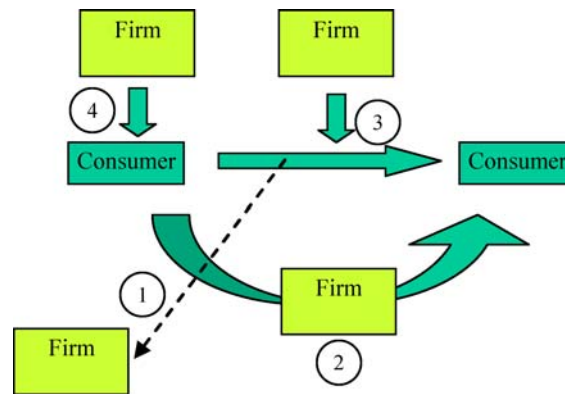


Figure 1. Four generic SI-management strategies.

#### 4.1. The Firm as Observer

The potential to learn from the observation of SIs is great<sup>5</sup> but the measurement challenges are non-trivial. Most major firms today engage in some observation, using one or both of two approaches—online communities and surveys. While we know of no empirical study, casual observation suggests that most firms track a subset of relevant online communities to get a picture of what their customers think about them and their competition. This emphasizes the need for a comparison of online and offline SIs. Online conversations can be observed cheaply and in real time, making them an attractive data source. However, we need to understand and manage possible biases in these data.

The key question is what the firm hopes to learn from observing SIs. Once this is answered, one must assess how and where this learning is best accomplished. Thus, it may help to broaden the set of inquiries into SIs beyond the current focus on sales, and use SI metrics to evaluate brand equity, customer satisfaction or competitive position. More generally, we must identify what SI measures can tell the firm about its customers, products and competition.

Related to this, we also lack a clear sense of the firm's optimal response to such observation. For example, how should its marketing strategy change as SI measures change? If the firm sees a number of negative comments, should it respond? Even with traditional marketing, how does the SI data collected play a role? Chen and Xie (2005) study how product review information from influential experts affects firms' pricing and advertising strategies. They show that these reviews can have substitutive and/or complementary effects on firms' advertising depending on review format and product quality. Advertising to broadcast the good news can in fact hurt products that get favorable expert reviews and it is not necessarily wise to boost advertising expenditures to spread good news. More research must address the firms' optimal responses to non-experts—what does one do when there's a bad rumor, for example?



#### 4.2. *The Firm as Moderator*

In this role, the firm goes beyond simply gathering information about conversations and takes steps to foster the conversations. Establishing online communities to allow customers and prospects to exchange information is one popular approach. Among the interesting and important questions surrounding this strategy is when is it likely to benefit the firm to establish such a site? Chen and Xie (2004) investigate this decision and argue that online consumer reviews may work as free sales assistants for the firm by helping match the customer and a product. For a monopolist, such a strategy makes particular sense when the buyers are unsophisticated and the product category is complex. Thus, firms should provide online reviews for particularly difficult decisions. More work remains to be done in building our understanding of online reviews on issues such as how the firm should structure such an online community? Thus, should there be restrictions on reviewers and incentives for providing reviews?

Another popular form of moderation, the customer recommendation program, has drawn recent research attention. Biyalogorsky et al. (2001) show that in a monopoly model, it is sensible to reward people for their recommendations only if they are *not* more delighted by the product than by the rewards. Chen and Shi (2004) build on this work to investigate rewards programs and types of rewards in both monopoly and competitive settings. They find that monopolists prefer to give out cash rewards while duopolistic firms may be better off offering future discounts. The recommendation programs may increase (complement) or decrease (substitute) the initial advertising to reach early adopters. The programs complement (substitute) advertising when the advertising cost and/or consumers' price sensitivity is high (low).

Of-course, consumers are savvy and know that incentives may bias other consumers' recommendations, and may "discount" these referrals accordingly. Verlegh et al. (2004) study when and how financial incentives increase the accessibility of possible ulterior motives on behalf of the recipient, which leads in turn to a decrease in perceived sincerity and WOM effects. These studies illustrate how persuasion knowledge and fairness perceptions play an important role in consumer evaluations of (and responses to) the firm's role as moderator of SIs. Related to this, one sees a number of important and unanswered questions: How should a firm design a recommendation or referral program? What is the effect of such programs on the rest of the marketing mix? Who should the firm target in order to facilitate spread of information? How can the firm affect the shape of the social network? These questions might be addressed either in a lab setting or in field settings with quasi-experimental designs set up with a firm's participation.

#### 4.3. *The Firm as Mediator*

In this role, the firm actually takes control of the information and disseminates it itself. On one hand, this is a subtle distinction from the moderator role. After all, doesn't an online review site require the firm to "take control" of the information? Of course, this is the case. However, as a mediator, we envision a firm making strategic decisions as to

how and to whom the information will be disseminated. This is typically *not* the case in an online review site. A prototypical example of this is the firm's use of reference accounts. For example, imagine a software company coming off of a successful installation of its product. The firm might ask if the client would serve as a reference account. The key distinction, then, is that it is not the client's decision to disseminate the information, it is the firm's.

The above raises several questions that need analytical and empirical answers. First, how does the firm "acquire" the WOM? How should the firm think about managing its portfolio of reference accounts? For example Granovetter's (1973) work might imply that the firm should optimally seek reference accounts from diverse groups. Yet, a new product is often best launched by focusing on a single segment. How do these two motivations interact? Another closely related example of mediation is the firm's dissemination of WOM in its advertising. A firm claiming that, "Nine out of ten dentists would recommend our product for preventing gum decay," is trying to leverage consumers' willingness to rely on the credibility of an expert in important decisions. How should the firm decide which customer receives which information and how might the consumer discount the information provided?

#### 4.4. *The Firm as Participant*

Finally, firms also have the option of participating directly in consumer-to-consumer conversations by creating WOM. Typically, we think of this as occurring anonymously. The central question here is how and when the firm should do so. In terms of impact, is it possible (and, if so, how) for firms to create incremental WOM that drives sales? Finally, how does this complement or substitute traditional advertising?

Several studies have begun to address this issue. Mayzlin (2004) develops a model where two competing products, differentiated in their consumer value, anonymously post online promotional messages. She finds a unique equilibrium where online word of mouth is persuasive despite the promotional chat activity by competing firms. In this equilibrium, firms spend more resources promoting inferior products, in striking contrast to existing advertising literature. Dellarocas (2004) finds that strategic manipulation of online forums can either increase or decrease the information value of a forum to consumers. If the number of consumers who post honest online reviews is sufficiently large, forum manipulation is harmful to firms because its cost outweighs its benefits. Nevertheless, competing firms are locked in an "arms race" and spend resources on such activities to prevent each other from distorting consumer beliefs about their relative qualities. Godes and Mayzlin (2004) study a national firm's attempt to create WOM through two customer populations: loyals and non-loyals. They find that WOM that is most effective at driving sales occurs between acquaintances (not friends) and is created by non-loyal customers (not loyals). This result demonstrates the potential value of exogenously created WOM. Also, among non-loyal customers, those with a wide social network may create this kind of WOM more effectively than "opinion leaders."

Beyond important ethical questions, the firm as participant faces several strategic issues that need answers. How should firms participate in SI's? When is participation preferred to

moderation or mediation? What types of people should the firm hire if it is to participate? Some of these questions may be answered as we understand better the incentives to spread WOM.

## 5. Recent Methodological Developments

Answering the questions posed in this paper promises to be a daunting task. The combinatorial complexity resulting from the multi-generational and dynamic nature of SIs (“she tells two friends who tell two friends and so on and so on”) makes all but highly-simplified analytical approaches intractable. For example, Banerjee’s (1992) analysis assumes a linear flow of communication in which the stage  $n$  agent can only observe the actions of the stage  $n - 1$  agent. Mayzlin’s (2004) analysis is limited to a single generation of agents who observe information but do not “pass it on.” We highlight here three alternatives to traditional analytical and empirical approaches that may offer promising avenues for tackling these difficult problems.

### 5.1. Cellular Automata

Cellular automata represent a numerical simulation approach that captures directly the combinatorial mechanism inherent in SIs.<sup>6</sup> Goldenberg et al. (2004) use cellular automata to model the evolution of a market for a network good in order to identify separately the roles of SIs and network externalities. Past adopters can influence a new product’s growth either through direct communication or through the information contained in the number of adopters. The authors find that, counter to conventional wisdom that network externalities create positive feedback and speed up adoption, network externalities induce a “chilling effect” on new product growth and thus, on industry profits. These findings also have empirical support.

### 5.2. Classifiers

The breadth and depth of online conversation data are both a blessing and a curse. The curse stems from the fact that it is hard to process (much less make sense of) such high dimensional data in large volumes. Das and Chen (2004) develop a technology to extract the content and meaning of conversations on financial message boards. They use five distinct classification algorithms to construct an index of “sentiment” based on messages in these communities. They find evidence of a relationship between these conversations and stock returns. Their analysis suggests that market activity influences small investor WOM. The algorithms may be used to assess the impact on investor opinion of management announcements, press releases, third-party news, and regulatory changes. It is not hard to see marketing applications of these ideas. Analogous methods may be used to assess the sentiment in brand-specific communities or in communities dedicated to a newly-launched movie or CD.

### 5.3. *Experimental Economics*

Finally, an inherent problem with the traditional econometric approach to studying social effects is that it is difficult to get a deep understanding of the underlying process. An approach that has not been widely adopted but which might appear to offer promise is experimental economics. Examples of such work include Gneezy et al. (2003), and Celen and Kariv (2003). The attractive aspect of this methodology is, of course, that one is able to manipulate exogenously the factor of interest, and (ideally) focus on specific aspects of the process. This might be of particular value in the studies of motivation called for above.

## 6. Conclusion

Social interactions are an important phenomenon in the workings of both aggregate markets and individual choice. In this paper, we argue that it is now time for a focused inquiry into the *firm's role* in this process. What should the firm do to manage the social interactions surrounding the consideration of, discussions about and experience with its product? We have presented a set of questions the answers to which will improve significantly our understanding of this important problem. Moreover, to provide structure to the firm's decision, we offer a framework delineating the firm's options.

## Notes

1. In fact, we note that our conceptualization of "social interactions" is broader than the extant literature (Brock and Durlauf, 2001, for example) in which this term has typically referred principally to the impact of others' choices on my expected utility without considering the broader set of impacts.
2. Source: Berry, J. and Ed Keller, (2004). *The Influentials*, New York, NY: The Free Press.
3. Diagnosticity and accessibility (see Feldman and Lynch (1988)) may offer a potentially useful framework for examining the different processes for positive and negative information. That is, a positive and a negative experience may differ in accessibility depending on how differentially the two experiences are coded in memory.
4. Note that these approaches typically specify SIs in a "reflective" model (Jarvis et al., 2003) in which the unobservable construct—SIs—is assumed to cause directly the measure (adoption or sales, for example).
5. It is interesting to note that a number of consultancies have been launched to provide to the firm the capabilities of observation. See, for example, [www.intelliseek.com](http://www.intelliseek.com), [www.buzzmetrics.com](http://www.buzzmetrics.com) and [www.motivequest.com](http://www.motivequest.com).
6. For a brief overview of cellular automata and small world networks, see [www.complexmarkets.com](http://www.complexmarkets.com).

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