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# Customer-to-Customer Interactions: Broadening the Scope of Word of Mouth Research

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## Abstract

The increasing emphasis on understanding the antecedents and consequences of customer-to-customer (C2C) interactions is one of the essential developments of customer management in recent years. This interest is driven much by new online environments that enable customers to be connected in numerous new ways and also supply researchers' access to rich C2C data. These developments present an opportunity and a challenge for firms and researchers who need to identify the aspects of C2C research on which to focus, as well as develop research methods that take advantage of these new data. The aim here is to take a broad view of C2C interactions and their effects and to highlight areas of significant research interest in this domain. The authors look at four main areas: the different dimensions of C2C interactions; social system issues related to individuals and to online communities; C2C context issues including product, channel, relational and market characteristics; and the identification, modeling, and assessment of business outcomes of C2C interactions.

## Keywords

word of mouth, social influence, new media, social networks, customer management

## Introduction

Over the past decade, one of the most significant developments in marketing thought has been an increasing emphasis on understanding the antecedents and consequences of customer-to-customer (C2C) interactions. Although it has long been recognized that C2C interactions can increase growth and profitability (Arndt 1967), marketing academics and practitioners increasingly view C2C interactions as important to business performance. This change is evident from the formation of the Word of Mouth Marketing Association (WOMMA) by leading marketers and the substantial increase in the number of academic and trade publications on the topic of C2C interactions.

Three fundamental changes in the marketplace have fostered this development. First, customers are connected in numerous ways that were not available in the past, including through social networking sites, blogs, wikis, recommendation sites, and online communities (Hennig-Thurau et al. 2010; Wuyts et al. 2010). This phenomenon has led to changes in the fundamental relationships of firms with their customers—as well as challenges to our definition and understanding of social networks. This new environment has caused marketers to reconsider how they define and understand C2C interactions and their importance to the firm.

Second, managers and academics are exposed to comprehensive C2C information that was heretofore unavailable. Historically, social network analysis was based on a small number of

repeatedly analyzed databases. However, the flow of large-scale social network data from multiple sources—including many online sources—has led to social network analyses and reports that can enhance decision making and market outcomes (Hill, Provost, and Volinsky 2006). This phenomenon presents an opportunity and a challenge for firms and researchers who must identify the aspects of C2C research on which they should focus, as well as develop research methods that take advantage of these new data.

Finally, researchers and managers increasingly realize the need to focus on the broader consequences of customer relationships with the firm. The emerging focus on customer engagement

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**Table 1.** C2C Interactions: Topics and Important Research Questions

Topic	Important Research Questions
<b>C2C dimensions</b>	
Observational learning vs. verbal communications	<ul style="list-style-type: none"> <li>To what degree does observational learning play a role in C2C interactions compared to verbal word of mouth?</li> <li>To what extent does the role of observational learning change by market characteristics?</li> </ul>
Online vs. offline venues	<ul style="list-style-type: none"> <li>To what extent the increasing findings on volume, valence and content of online social interactions are relevant for their offline analogs?</li> </ul>
Dyadic vs. group information flows	<ul style="list-style-type: none"> <li>What differential dynamics are created in multi-participant C2C interaction vs. a dyadic interaction?</li> </ul>
B2C vs. B2B markets	<ul style="list-style-type: none"> <li>How does the “buying center” integrates C2C information into internal interactions, toward a decision?</li> </ul>
Organic vs. amplified (firm affected) interactions	<ul style="list-style-type: none"> <li>To what extent people are willing to accept and transmit “amplified” word of mouth?</li> <li>How does amplified word of mouth integrate (and possibly affect) customers acceptance of organic word of mouth?</li> </ul>
<b>C2C social systems</b>	
The role of influentials	<ul style="list-style-type: none"> <li>How should we build more comprehensive measures to understand influentials’ full impact on growth and profitability?</li> <li>What are the differential roles of influentials in online and offline environments?</li> </ul>
Online brand-focused communities	<ul style="list-style-type: none"> <li>Which type of governance mechanism best stimulates C2C engagement in brand focused communities?</li> <li>How do normative governance and reputation-based governance interact to influence the C2C interaction?</li> </ul>
<b>C2C context: potential moderators</b>	
Product characteristics	<ul style="list-style-type: none"> <li>How do product characteristics explain the large variance in contagious behavior among products?</li> </ul>
Channel characteristics	<ul style="list-style-type: none"> <li>How does the magnitude of C2C interactions (and specifically observational learning) vary among channels?</li> </ul>
Relational characteristics	<ul style="list-style-type: none"> <li>What is the role of distance is the effect of C2C interactions?</li> </ul>
Market characteristics	<ul style="list-style-type: none"> <li>How does the nature of the market (e.g., the availability of high level information) affect the role of C2C interactions?</li> </ul>
<b>Assessing the C2C effect: Realizing the outcomes of C2C interactions</b>	
Issues of identification	<ul style="list-style-type: none"> <li>To what extent does homophily drive what is perceived as social interactions?</li> </ul>
Modeling C2C interactions: agent-based models	<ul style="list-style-type: none"> <li>How should the individual level effect be modeled?</li> <li>To what extent does the C2C interaction effect decay over time and network distance?</li> </ul>
Combined with traditional media	<ul style="list-style-type: none"> <li>To what extent traditional media drives the efficacy of C2C interactions?</li> <li>How can we separate the two effects?</li> </ul>
Cost reduction	<ul style="list-style-type: none"> <li>What role does mutual support among customers play in their profitability to the firm?</li> </ul>
Growth in customer value (cross-sell and retention)	<ul style="list-style-type: none"> <li>How can we identify ways in which C2C interactions affect profitability via the effect on customer development and retention?</li> </ul>
Customer acquisition and purchase acceleration	<ul style="list-style-type: none"> <li>To what extent the business value of C2C interactions is driven by the acquisition of new customers versus bringing forward expected purchases?</li> </ul>

Note: C2C = customer-to-customer; B2B = business-to-business; B2C = business-to-consumer.

draws attention to motivationally driven customer behaviors towards a brand or a firm, beyond mere purchase (van Doorn et al. 2010). A key outcome of customer engagement is the way other people are affected by the engaged customers, directly or indirectly. Thus, the study of C2C interactions enables us to explore how customer engagement influences the bottom line and its role in creating value within customer-firm relationships.

The purpose of this article is to highlight directions for future research on C2C interactions. Our basic premise is consistent with the call of Godes et al. (2005) for a broader look at the dynamics, measures, antecedents, and consequences of C2C interactions. We look at the scope, the effect of the

environment, and the assessment of the outcomes of C2C interactions. Table 1 summarizes our approach; it describes four major issues.

The first issue relates to the scope of what may be defined as “customer-to-customer interactions.” Historically, the term “word of mouth” (WOM) was used to describe interactions (mostly verbal) among customers. However, the increasing diversity of C2C interactions, especially in electronic environments, warrants a broader multi-dimensional view of C2C interactions. We begin by focusing on different dimensions of C2C interactions that deserve research attention and specific research questions that stem from this broader view.

We next consider the environment in which C2C interactions occur, which leads us to the two next topics: the social system and C2C context. Regarding the former, it is important to understand that the consequences of customer engagement may largely depend on the way many customers are connected via social networks that combine to form a social system. In this domain, we first examine the individual level, where we consider the influence of particular people in the social system, an issue that historically had drawn much attention by marketers in the past and even more so today (Goldenberg et al. 2009). Second, we examine the system level, where we explore the emergence of brand-related customer communities, a unique form of social network structure whose dynamics present new challenges to our understanding how customers affect each other and create new forms of relationships with brands. Third, we continue our exploration of how C2C interactions are affected by environmental factors by examining the general context of C2C interactions. The nature of product, channel, relational, and market characteristics create a context that moderates the effect of interactions among customers, and this analysis yields a number of issues that should be explored.

Finally, we consider the measurement of the business outcomes of C2C interactions. We look at the challenges of identifying and modeling customer-level interactions, as well as new tools such as agent-based models that enhance our ability to study the complex nature of C2C dynamics. When exploring the business outcomes of C2C interactions, we highlight the need to understand how they interact with traditional media and how C2C interactions influence a range of outcomes—distinguishing between customer acquisition and acceleration, and taking into account, cross-selling, retention, and cost reduction.

We do not seek to comprehensively review extensive past research on C2C topics. For such efforts, readers may consult recent comprehensive reviews of C2C-related research from both the perspective of innovation diffusion and new product growth (Muller, Peres, and Mahajan 2009) and the social network analysis (Van den Bulte and Wutys 2007). Instead, we focus on topics that we believe are essential to understanding C2C interactions in our contemporary environment. Our goal here is to identify knowledge gaps and provide suggestions for future research. We are convinced that C2C interactions will play a major role in the business environment and it is our intention to generate new ideas and stimulate further research in this area.

## C2C Dimensions

In the past, the classic perspective on customer WOM has been a picture of two individual customers talking about a brand. This is, of course, an incomplete view because different customers affect each other in many ways, sometimes even unknowingly. A broader view taken here defines “C2C interactions” as the transfer of information from one customer (or a group of customers) to another customer (or group of customers) in a way that has the potential to change their preferences, actual purchase behavior, or the way they further interact with others. Next, we discuss a number of dimensions that fall under

this broader perspective and are in need of further exploration in C2C research.

### *Observational Learning Versus Verbal Communication*

People frequently learn by merely observing the behavior of others, which can lead to large-scale imitation behavior (Earls 2007). Behavioral learning processes have been extensively discussed in the economics literature, especially with respect to herd behavior and information dissemination (Bikhchandani, Hirshleifer, and Welch 1992), as well as in the sociology literature that studies collective action (Macy and Willer 2002). Recently, the marketing literature has explored the dynamics of innovation growth created by observational learning mechanisms (Muller, Peres, and Mahajan 2009; Zhang 2010). With respect to individual customer behavior, researchers are making increasing effort to understand how mimicry affects choice and preferences (Tanner et al. 2008) and how customers use the number of other product users to signal their identity and make decisions that will diverge from others (Berger 2008; Berger and Heath 2008).

We believe that marketing academics will become increasingly interested in observational learning as a fundamental form of C2C interaction. One reason is that online environments provide many opportunities for customers to observe and learn in easy and precise ways about the behavior of others. Moreover, online environments allow researchers to conduct realistic large-scale experiments that examine how people are affected by others’ selections (Salganik, Dodds, and Watts 2006) and they provide new tools, such as “Google Insights for Search,” that can help researchers to analyze trends across different areas.

*Research directions.* Research in this area should further contrast our knowledge of traditional WOM with findings on the effects of observational learning, so that we can understand the difference between the two phenomena. At the market level, we need to understand the degree to which observational learning plays a role in C2C interactions compared to verbal WOM and to what extent it changes by product categories and market segments (see also a discussion in the section on C2C context). At the individual level, we should better understand how the underlying mechanisms differ. For example, while attribution theory had been explored in the context of WOM (Laczniak, Decarlo, and Ramaswami 2001), researchers should further explore how the mechanisms of attribution work in the case of mere observation to understand the observer’s interpretation of signaling. Similarly, we need to understand the analogy to negative WOM via observational learning: When and how is NOT being able to observe perceived as a “negative” C2C interaction?

### *Online Versus Offline Venues*

Much of our recent knowledge regarding C2C interactions comes from online environments, especially customer-generated data sources: recommendations provided by Amazon or other

websites (Chevalier and Mayzlin 2006), social networking sites (Trusov, Bucklin, and Pauwels 2009), chat rooms (Godes and Mayzlin 2004), and online communities (Mathwick, Charla, and de Ruyter 2008). A plethora of online media types are expected to play an increasing role in the creation of C2C interactions (Winer 2009; Hennig-Thurau et al. 2010).

Relatively limited attention has been given in recent years to the diversity of interaction types in offline environments. Offline C2C interactions can occur face-to-face in mobile environments (e.g., car), in-store, at home, work, and so on. C2C interactions in-store are likely to be powerful (possibly even more for observational learning) and it seems very likely that mobile communications will increase verbal C2C interactions that take place close to point of purchase. Yet, research related to both mobile marketing (Shankar and Balasubramanian 2009) and retail-related communications (Ailawadi et al. 2009) had focused more on the communication between marketers and consumers, often in the form of advertising, and less on related C2C interactions.

**Research directions.** Given the extensive research attention devoted to online C2C, it is interesting to note that market research surveys suggest that offline C2C interactions may still affect consumption much more than online C2C interactions (Keller 2007). The difference between the two venues is underexplored, leading Godes et al. (2005) to ask whether the volume, valence, and content of online social interactions are acting as a proxy for their offline analogs. Although recent research examines ways to measure interpersonal influence in online conversations (Dwyer 2009), more research is needed to investigate and compare C2C interactions in online and offline environments—to better understand differences in the nature and magnitude of their effects on individual and market outcomes.

### **Dyadic Versus Group Information Flows**

Classic WOM research has typically studied dyads, consisting of a receiver and a sender, as the unit of observation. In contrast, conversations frequently take place among groups of people. Online social media environments create new forms of group conversations with large numbers of participants taking on different roles. For example, conversations in online communities and forums include “threads” in which multiple people participate at different stages, with other people only observing. Often, these group conversations are labeled WOM (Brown, Broderick, and Lee 2007), yet they are very different in nature from WOM in dyads. We will elaborate on the research challenges related to C2C interactions in online communities in a separate section of this article and present specific research questions in detail.

### **Business-to-Consumer (B2C) versus Business-to-Business (B2B) Markets**

Researchers have primarily studied C2C interactions among end users—typically among people in B2C markets. However,

social influences also operate in B2B markets; observational learning and WOM behavior can take place between managers within and across firms (Stephen and Toubia 2010; Wangenheim and Bayón 2007). There are indications that B2B firms increasingly aim to formalize the processes by which their customers give referrals to one another (Godes 2008). However, there is limited research on C2C interactions in B2B environments and how they are different from B2C environments.

**Research directions.** Given that most of what we know on C2C interactions comes from the C2C domain, more research is needed to understand the equivalence, and the unique features of C2C interactions in B2B environments. For example, previous research has focused on interactions within the “buying center” in organizations (Johnston and Bonoma 1981) and we know less on how different members of the buying center are affected by external information from other customers and how this information is integrated in the buying center toward the decision. More research is needed to explore C2C questions that are specific to B2B environments: for example, if and how C2C interactions occur among competitors and the extent to which reference programs are perceived as a reliable source by B2B customers (Godes 2008).

### **Organic Versus Amplified C2C Interactions**

Recently, firms have attempted to structurally affect C2C interactions of their customers via tools such as WOM agent campaigns, opinion leader programs, viral marketing, and referral reward programs (Godes et al. 2005). The WOMMA has thus distinguished between *organic WOM* that occurs naturally, without the firm’s intervention, and *amplified WOM* that occurs when marketers launch campaigns designed to encourage or accelerate WOM in existing or new communities. Recent research has suggested alternative ways to demonstrate the profitability of these programs (De Bruyn and Lilien 2008; Godes and Mayzlin 2009; Kumar, Petersen, and Leone 2010; Libai, Muller, and Peres 2010; Toubia, Stephen, and Freud 2009). From other angles, researchers have studied the extent to which amplified C2C is accepted as reliable by receivers (Carl 2008), optimal promotion (Mayzlin 2006), how the incentive system may affect both the sender and receiver (Ryu and Feick 2007), and ethical issues related to the use of such methods (Ashley and Leonard 2009; Martin and Smith 2008).

**Research directions.** A basic question relates to the degree that our knowledge from amplified C2C interactions can extend to organic interactions and vice versa. We need to further understand the extent to which people are willing to accept and transmit amplified WOM, how it integrates (and possibly affects) their acceptance of organic WOM, and the different value each type of social interaction creates. For example, researchers have considered the “referral value” of customers in the context of referral reward programs (Kumar, Petersen and Leone 2010). The dynamics that create such value may be largely related to

the incentive scheme of the program (Ryu and Feick 2007) and thus the extent to which the high “amplified value” customers will create “organic value,” is yet to be examined.

## C2C in a Social System

Moving to the environment in which C2C takes place, we first note that C2C interactions occur in the context of social networks that together aggregate to a social system. The structure and dynamics of such networks have a fundamental effect on C2C interactions and firm outcomes. Research on this topic is interdisciplinary in nature; a large body of research findings has emerged in recent years (Jackson 2008; Van den Bulte and Wuyts 2007). This section focuses on two C2C issues that are very timely and relevant for firms who seek to leverage C2C interactions to improve business performance. The first issue is at the individual level and deals with the role of influential individuals in networks. The second issue is at the social system level and focuses on governance issues arising from the unique networks created by online customer communities.

### *The Role of “Influentials” Within Networks*

Academic study of C2C interactions has given considerable attention to the role of people with substantial social effects on others—sometimes labeled opinion leaders, influentials, influencers, or hubs (Goldenberg et al. 2006; Goldenberg et al. 2009; Watts and Dodds 2007). For simplicity, we will use the term “influentials.” The idea that some people may create more social influence than others is accepted, yet there are mixed views on the magnitude of the effects. Recently, researchers have argued that influentials do not create contagion processes that differ significantly from those of other people (Watts and Dodds 2007), generating further calls for marketers to consider the use of marketing programs that rely on influentials (Watts 2007). However, there is a body of evidence from both industry (Keller and Berry 2003) and academia (Goldenberg et al. 2009; Iyengar, Van den Bulte, and Valente 2008) on influentials’ role in new product sales growth. In practice, firms increasingly use available data to identify and target influentials (Kirby and Marsden 2006; Kiss and Bichler 2008).

The effect of influentials may depend on the way “influence” is conceptualized and measured. Some research focuses on people within a large social network (Goldenberg et al. 2009; Watts and Dodds 2007); whereas other research takes into account the perceived expertise of the sender (Goldenberg et al. 2006). Given the increasing availability of network data, researchers can further broaden the definition and measurement of an “influential” by examining network centrality measures such as *betweenness* or *page rank*; these assessments take into account the impact of a person beyond his or her close social network (see Kiss and Bichler 2008; Lee, Cottea, and Noseworthy 2010). The relevance of network centrality measures may differ depending on the role of the individual within the network. For example, in a recent study of children, Kratzer

and Lettl (2009) demonstrate that opinion leadership is significantly related to degree centrality, but not to betweenness or closeness centrality.

*Research directions.* From the standpoint of the firm, the extent to which a customer is an influential should be determined by their importance to the firm (beyond their own purchases)—and their importance may vary in different situations. The impact on the firm’s customer equity may be a good measure toward this end (Libai, Muller, and Peres 2010). Taking a more holistic view, further research is needed to explore the contradicting evidence on the contribution of influentials to growth and profitability, examining both model assumptions and measures. This research effort should also take into account the different business outcomes the firm realizes from C2C interactions (see also the last section of this article).

Another pressing issue is to better understand the different roles of influentials in offline and online environments. The magnitude of the effect of influentials in offline environments may be limited (Watts and Dodds 2007), whereas in online environments (such as consumer online communities), we see cases in which a small number of individuals have relatively very large-scale effects on others. The characteristics and drivers of such individuals and the mechanisms in which massive influence is created should be further explored.

### *C2C Interactions Within Brand-Focused Communities*

*Implications of social capital for network governance.* We began this section by discussing how influentials influence individual customers’ purchase and consumption behavior within the network and (ultimately) business performance. However, it is widely recognized that—beyond the consumption value of products and services—customers seek “linking value,” that is, value based on peer-to-peer bonds and socially embedded consumption, which is part of their “social capital” (Cova 1997; Lin 2001). Consequently, it is important to consider the antecedents and consequences of C2C interactions—and the important role of social capital formation (see Mathwick, Wiertz, and de Ruyter 2008)—within social system structures. In particular, social capital formation plays an important role in C2C interactions within brand communities (Muniz and O’Guinn 2001), as well as within brand service channels that provide after-sales support via peer-to-peer problem solving (P3) communities (Mathwick, Wiertz, and de Ruyter 2008). Many firms sponsor virtual community websites because they yield specific benefits that include service support cost reduction, generation of valuable customer feedback, and relationship marketing opportunities. For example, in “open source spaces,” users develop new software and share information and WOM, generate innovative ideas, look for social support, and collaborate on generating innovative ideas (e.g., Kozinets, Hemetsberger, and Schau 2008).

Participants acquire social capital within communities. However, firms face challenges in leveraging the C2C

interactions within communities (virtual or face-to-face) to improve business performance because online networks are interactive systems with permeable boundaries, based on the principles of self-organization among heterogeneous actors. They are not formally organized within the firm-controlled, hierarchical system and (consequently) they are ultimately beyond the control of the firm. These features raise intriguing research questions regarding how firms can manage and enhance customer-firm relationships in these environments. Specifically, research is required to investigate, theoretically and empirically, how to govern the engagement of groups of virtual community members.

Online collectives are largely voluntary, self-organized, and democratic rather than legalistic or authority driven; they lack an organizational chart structure. Moreover, participants are heterogeneous and participation changes over time, so that network governance is a very complex issue (O'Mahony and Ferraro 2007). Conventional principal-agent governance systems that are based on contracts and monetary benefits are inappropriate (Moon and Sproull 2008). For example, C2C interactions can be affected by the emergence of factions, sometimes in opposition, within virtual collectives. This feature arises because members are "enacting symbolic boundaries that affirm distinctions between collectivities" (Holt 1997, p. 343). Therefore, firms must consider other types of governance to influence the direction of group dynamics, recognize free-riding in the group, and generally stimulate customer engagement.

*Normative versus reputation-based governance mechanisms.* In considering governance of online collectives, it is important to distinguish between C2C interactions that occur at the social core versus the periphery of the network (Mathwick, Wiertz, and de Ruyter 2008). People enter at the periphery and learn about the interactive experience by observing the behavior of other members; these novices or "newbies" undergo a gradual process of socialization into the community core and longer term affiliation (Lave and Wenger 1991). Their initial level of engagement in C2C interaction is relatively low. Value creation is based primarily on having access to instrumental resources such as knowledge and information (Wasko and Faraj 2005). In contrast, experienced participants, such as lead users or "wikis," commonly develop the social core around which the community revolves (Mathwick, Wiertz, and de Ruyter 2008). Since people in different factions within a network have different experiences, their perceptions of instrumental versus linking value are different. For this reason, we believe that it is important to distinguish between normative and reputation governance mechanisms.

Normative governance is based on the regulatory strength of communal norms that form the basis of social capital, such as reciprocity, voluntarism, and social trust (Mathwick, Wiertz, and de Ruyter 2008). Enforced through peer pressure, these implicit rules may generally decrease members' tendencies to take (but not give) and hence form a buffer against free riding and other opportunistic or deviant actions (cf. Heide and John 1992). It has been contended that normative governance

requires "the acceptance and commitment of all parties and usually the consensus of the larger social network in which the exchange is embedded" (Cannon, Achrol, and Gundlach 2000, p. 184). The norms can be explicit, such as in simple written agreements and social contracts regulating behavior and sanctions for transgression (usually referred to as "netiquette") or implicit as they can be observed from community discourse. As such, normative governance is not designed a priori, instead it emerges post hoc.

Reputation-based governance mechanisms for online social networks are widespread. For example, online market places, such as eBay, heavily depend on feedback systems. Unlike normative governance mechanisms, these mechanisms are not emerging properties of systems; they are designed and implemented by the community sponsor or organizer. As members of the network contribute, they achieve recognition and social rewards that indicate subtle differences in status, prestige, or expertise. The underlying social mechanism is based on symbolic capital. Reputation mechanisms have been used as proxies for member reliability but they also motivate participation behavior and quality input (Dellarocas 2003; Moon and Sproull 2008). The nonmonetary benefit is selective because it is awarded solely to those who contribute—thereby differentiating between those who produce and free riders.

*Research directions.* Several research questions arise. First, which type of governance mechanism works best in stimulating C2C engagement and interactions? Second, is the effectiveness of governance mechanisms contingent upon certain factions within the network? Third, are the two governance mechanisms complementary or do they interfere with each other? Fourth, as many types of reputation systems mechanisms exist (e.g., points, symbols, and subjective and objective evaluations), it is not clear which one works most effectively. Fifth, in relation to normative governance, it would be interesting to evaluate whether implicit or explicit (e.g., rules of conduct or community commandments) exhibit a differentiating impact on customer engagement. Sixth, while we emphasized the recognition of group differences in online collectives, it may be worthwhile to also consider which individual differences influence the operation of governance. Finally, from a traditional, one-to-many communications perspective, free riding and lack of governance may not always be disadvantageous, as community sponsors may benefit from off-loading frequently asked questions to this channel (in a Wikipedian fashion). In that sense it remains to be researched whether community lurking and customer engagement are orthogonally related.

## How Context Moderates the Effect of C2C on Behavior

The second C2C environmental topic we discuss is that of context. Marketers are interested in both the antecedents and consequences of C2C interactions. However, as discussed in the preceding section, firms are especially interested in leveraging

C2C interactions to influence individual purchase behaviors and (ultimately) business performance. Emerging research suggests that the influence of C2C interactions on customer purchase behaviors is moderated by (at least) five types of context variables: customer characteristics, product characteristics, channel characteristics (including sensory modes), relational characteristics (including geographic, temporal, and social distance) and market characteristics (including firm actions that amplify or diminish C2C effects, the nature of competition). Customer characteristics in a network structure, especially the role of influentials and brand-focused communities, were discussed earlier in this article. Hence, in the remainder of this section, we focus on how product, channel, relational, and market characteristics moderate the effects of C2C interactions on purchase behavior.

Since prior research has typically studied the influence of C2C interactions on trial, our discussion emphasizes what is known about how context variables operate in this domain. However, we believe that context variables will also moderate the effects of C2C interactions on repeat purchase behavior (i.e., purchase frequency or acceleration, purchase volume, and cross-buying). Our rationale is that there is substantial theoretical and empirical support that the relationship between customer satisfaction and customer purchase behaviors (trial, repeat, and cross-buying) is moderated by customer characteristics, relational characteristics and market characteristics (Bolton 1998; Tarasi et al. 2009; Verhoef 2003). For example, Seiders et al. (2005) have identified customer (e.g., income and involvement) and market (competitive intensity) variables that moderate the satisfaction-retail purchase behavior relationship. Similarly, researchers have found that demographic variables, such as income, gender, and education, moderate the link between satisfaction and customer behavior (Cooil et al. 2007). This research stream is relevant to understanding how C2C interactions influence purchase behaviors because customer satisfaction is an antecedent of customer engagement (van Doorn et al. 2010). Hence, if the effect of customer satisfaction on behavior is moderated by context variables, it is very likely that the effect of C2C interactions on repeat purchase behavior will also be moderated by context variables. In the remainder of this section, we briefly summarize how context variables moderate the effect of C2C interactions on trial—because there is theoretical and empirical support for these effects and their underlying mechanisms.

### *Product Characteristics*

Numerous product characteristics might influence the effect of C2C interactions on purchase behaviors. We expect that the magnitude of the effect of C2C interactions on purchase behavior will be larger for products that are highly visible, easily tried, or symbolic of an identity that is important to a customer. It also seems likely that the magnitude of the effect will be larger when product-market fit is high and when the product is compatible with the situation of an individual customer (Kamakura and Balasubramanian 1987; Mittal and Kamakura

2001). Finally, when people are less aware or less knowledgeable about products, they are more likely to rely on C2C interactions. For example, in both experimental and field settings, Godes and Mayzlin (2009) find that, for a product with a low initial awareness level, WOM that is most effective at driving sales is created by less loyal customers and occurs between people who are not close acquaintances. These observations suggest that further investigation of how product characteristics moderate the effects of C2C interactions on purchase behavior might be fruitful.

### *Channel Characteristics*

In early research on innovation and diffusion, C2C interactions—both WOM and observational learning—primarily occurred in face-to-face situations or over the telephone. However, with the advent of new media, it is increasingly likely that C2C interactions will take place in mobile, online, or retail environments—or some combination of them. The quality and quantity of information and sensory input can be very different in different channels. A mobile C2C interaction might be entirely text based (a brief “tweet” or a longer email), a photo or video (visual information, perhaps augmented with sound) or a voice conversation, or some combination. An online C2C interaction might occur on a blog, through a product review or rating (individual or aggregated), a video on YouTube, through a community that shares content (digital music) or a moderated discussion group. C2C interactions also vary in whether they are individual, group, or aggregated (e.g., aggregated product reviews); synchronous or asynchronous; and embedded in unbranded or branded content (e.g., media websites). The magnitude of the effects of C2C interactions across these diverse channels on purchase behavior—within and across channels—is unknown.

Marketing practitioners are especially interested in understanding: (a) differences in the magnitude of WOM versus observational learning effects that arise in different channel contexts; (b) differences in the magnitudes of effects of C2C interactions that are triggered by firms (e.g., amplified WOM through viral marketing campaigns) versus organic WOM; (c) differences in the magnitudes of effects of C2C interactions that occur in branded environments—such as online magazines, brand-sponsored communities, or retail sites—versus consumer communities; and (d) how mobile C2C interactions affect purchase behavior in retail environments. Marketing academics are especially interested in understanding the underlying mechanisms that cause these different effects. For example, we might expect the effects of observational learning on purchase behaviors to be more powerful in channels characterized by rich information and sensory input (e.g., face-to-face or video interactions). Yet, in a laboratory study, Celen and Kariv (2004a) find that—despite the informational equivalence of advice and actions—people are more willing to follow the advice given to them by their predecessors than to copy their actions. This finding raises an interesting question regarding the underlying mechanism by which channel characteristics

moderate the effects of WOM and observational learning on purchase behaviors. Does the nature of the channel—which influences the prevalence of text (which facilitates advice) versus observable action (which facilitates observational learning)—moderate the effect of C2C interactions on purchase behaviors?

### Relational Characteristics

Although a great deal of research regarding C2C interactions has focused on customer and network characteristics, Watts and Dodds (2007, p. 454) have emphasized that “to the extent that particular individuals appear, after the fact, to have been disproportionately responsible for initiating a large cascade or sustaining it in its early stages, the identities and even characteristics of those individuals are liable to be accidents of timing and location, not evidence of any special capabilities or superior influence.” This observation draws attention to the fact that geographic, temporal, and social distance may be much more important than customer characteristics.

Empirical evidence supports this observation. In an early study, Godes and Mayzlin (2004) studied WOM (on Usenet) for new television (TV) shows during the 1999 to 2000 season. They showed that a measure of the dispersion of conversations across communities explained variance in a dynamic model of TV ratings. Recently, Bell and Song (2007) studied shoppers’ trial of the Internet grocery retailer (netgrocer.com). They found that C2C interactions (WOM or passive observation) of spatially proximate shoppers influenced trial by people who had yet to experience the service and that the “neighborhood effect” increases the baseline hazard of trial by 50% after controlling for region-level fixed effects and time-dependent heterogeneity in the baseline rate. Moreover, they found that the space-time customer trial pattern depends on the number of households, population density, and the extent of urbanization. In a later study with the same vendor, Choi, Hui, and Bell (2010) find that the proximity effect is especially strong in the early phases of demand evolution, whereas the similarity among customers effect becomes more important with time.

### Market Characteristics

Naturally, we expect that market characteristics—arising from firm actions, competitor actions, and so forth—influence the effects of C2C interactions on purchase behavior. For example, environmental cues influence the effect C2C interactions on purchase behaviors (Berger and Fitzsimons 2008) and firm actions (such as the use of a celebrity spokesperson, product sampling, or trade shows) can stimulate and amplify C2C interactions. However, since there have been a limited number of studies of C2C interactions in different market contexts, there is little theory or empirical evidence on this topic. A notable exception is research in experimental economics, which has studied social learning, including informational cascades—in which people ignore private information—and herd behavior—in which people behave identically but without necessarily ignoring private

information (see Celen and Kariv 2004a). For example, Celen and Kariv (2004b) studied how individuals learn by observing the behavior of their immediate predecessors in a laboratory setting. They discovered that imitation is much less frequent when subjects have imperfect information, even less frequent than the theory predicts. In other words, despite the informational equivalence of WOM advice and actions, people are more willing to follow the advice given to them by their predecessors than to copy their actions in markets with imperfect information. This study suggests that the extent of information available in the marketplace moderates the effect of C2C interactions on purchase behaviors.

In addition, this finding naturally leads to managerial questions about the effect of C2C on purchase behavior in markets where firms use marketing programs (online or offline) to create WOM communication or to amplify the effects of WOM communication. For example, Toubia, Stephen, and Freud (2009) find that—although marketing programs involve a strong online component—most social interactions take place offline. This result suggests that marketing programs will be more effective in markets where C2C interactions take place offline—that is, markets for services in which production and consumption frequently takes place simultaneously and in the presence of other customers (e.g., retail and other service environments or highly visible goods). In general, marketers think of C2C interactions as multiplying the effect of firm marketing communications (e.g., Manchanda, Xie, and Youn 2008). However, research suggests that C2C interactions and firm marketing communications are mutually reinforcing.

Based on vector autoregression modeling and Granger causality tests, Trusov, Bucklin, and Pauwels (2009) conclude that WOM leads to more new members and more new members lead to more WOM. Equally importantly, they also find that WOM can enhance the effect of traditional marketing when that activity serves to stimulate WOM (e.g., promotions). This observation is consistent with the finding that people value sequences of selective strong ties as well as sequences of more numerous weak ties—where their preferences depend on the nature of the information being exchanged (Wuyts et al. 2004). This observation suggests that a mix of mutually reinforcing C2C interactions and marketing communications may be most effective. The implications of these issues modeling the interaction between C2C mechanisms and traditional media are discussed later in this article.

**Research directions.** Clearly, more empirical investigation is needed to understand the moderating effect of the context variables examined above. The issue of the product, for example, is of fundamental importance for understanding the role of C2C interactions in consumption. While we see numerous investigations of how the network relations of people affect the dynamics of social interactions, much of what we know on how C2C interactions are driven by specific products, and why certain products are “contagious” while others are not, is based on anecdotal evidence and examples from the press. In a similar manner, we need a comprehensive examination to identify the

interaction of C2C communication with channels, different markets, and types of relationships.

A relevant question in this regard is the interaction with different C2C dimensions we considered here. As discussed above, observational learning rather than verbal WOM may help us to understand the moderating effect of channel and market characteristics. The moderating role of context can depend, in fact on other factors, and may drive different C2C outcomes (see the last section). A comprehensive view is thus needed to capture the full role of context on C2C interactions.

## Assessing the C2C Effect

### *Realizing the Outcomes of C2C Interactions*

At the end of the day, managerial interest in C2C interactions is tied to the ability to demonstrate the contribution of such interactions to the firm. To do so, research should be able to identify social interaction effects and separate them from other effects, model the process to be able to assess the effect of different market scenarios, and understand the possible market outcomes of C2C interactions. Our final topic deals with these issues.

### *Statistical Models and the Challenges of C2C Identification*

To model the outcomes of C2C interactions, researchers must disentangle the complex dynamics created by social effects. In this situation, a major challenge is that of endogeneity or identification in systems of equations (Hartmann et al. 2008). Although we may observe an opportunity for communication between two people and a correlation in their behavior, our ability to infer that person A's behavior had been affected by an interaction with B is not straightforward. What may be perceived as social effect can actually echo similarities in customers' preferences and tastes that reflect their intrinsic tendency to behave similarly, or a common response to a similar external "shock," such as a promotion (Barrot et al. 2008; Manski 2000). The solutions to such problems often require rich data and advanced statistical analysis (Hartmann et al. 2008).

Fortunately, the increased availability of C2C data can mitigate some of the modeling problems. Although these data may not solve the underlying identification problem, it can facilitate more elaborate modeling schemes and thus provide (partial) remedy. There are a number of recent examples. Nair, Manchanda, and Bhatia (2010) analyzed data from a unique combination of a natural experiment and a detailed survey, so they were able to partially overcome some of the identification issues involved in separating the role of influentials and marketing campaigns. Hartmann (2010) used rich panel data to control of self selection bias in modeling the group influence on the individual demand decisions. Aral, Muchnik, and Sundararajan (2009) utilized rich demographic data and use propensity score matching to separate social influence from homophily in adoption decisions. Oestreicher-Singer and Sundararajan (2010) provide theoretical as well as empirical

evidence that identification of peer effects is simplified considerably when there are multiple overlapping networks mediating peer influence. These studies suggest that improved theory, data, and methodologies will ultimately allow researchers to explore the complex effects of C2C interactions over time in more depth.

*Research directions.* Clearly, better data and enhanced statistical methods are the key to an improved identification of the C2C process. The rich data available from social networking sites are especially promising in that respect. The results of Aral, Muchnik, and Sundararajan (2009) concerning the context of instant messaging on the Internet are of special interest because they point to the possibly largely undervalued role of homophily in what is often accepted as social effects. Similar exploration should be done in other domains to understand the magnitude of the phenomenon.

### *Identifying and Separating C2C Effects From Traditional Media*

Although the effect of C2C interactions on contagion and consumption is well recognized, the interactions of C2C mechanisms with traditional media mechanisms are still under explored. For example, some researchers argue that C2C impact may be overstated after controlling for external, nonsocial factors such as advertising (Van den Bulte and Lilien 2001). Separating the two effects is compound. The diffusion models based on the Bass (1969) model generally assume independence of the internal (C2C) and external (advertising) effect parameters. However, it is reasonable to assume that the two effects are interrelated (Manchanda, Xie, and Youn 2008; Villanueva, Yoo, and Hanssens 2008). This relationship is especially interesting because C2C interactions are often mentioned as an alternative to traditional media, yet marketers do not (yet) understand the extent to which C2C complements or substitutes for traditional media.

Recent studies have investigated these questions using new rich data sources. For example, using the TalkTrack WOM monitoring service, Keller and Fay (2009) suggest that a notable percentage of WOM conversations include references to advertising and that such conversations may be more influential than those conversations that do not mention advertising. Graham and Havlena (2007) examined 35 brands using weekly data that included WOM talks from the Keller Fay database, online brand mentions from Nielsen BuzzMetrics, Advertising spending from Nielsen's + Database, search queries from Hitwise, and website visits from ComScore Media Metrix. They concluded that advertising has a significant effect on brand advocacy. One of the limitations of their approach is the use of a simple regression that may not take well into account the complex relationship between C2C and advertising.

More advanced methods, such as Vector Autoregressive (VAR) models, may be of help on this issue, and are increasingly used with the rich data available from social networking sites and other sources. For example, Trusov, Bucklin, and

Pauwels (2009) studied at the forces that drive the membership growth of an online social networking website. They examined both WOM referrals (i.e., an existing member “inviting” a nonmember to join the site, a type of C2C interaction) and media effects (e.g., publicity and advertising). They found that WOM is a major driver of the growth of this website and that WOM referrals have substantially longer carryover effects than traditional marketing actions.

Stephen and Galak (2009) used a VAR model to look at how social media activity (e.g., online discussion forums and blogs) and traditional media publicity activity (e.g., print media articles and TV coverage) affect sales from new and existing members of a prominent micro financing website. They focused on how the different types of media influence each other to generate buzz and publicity. They find that traditional media has an effect on performance akin to a “high margin, low volume” product (i.e., big return but infrequent occurrence) and social media has the opposite effect and is like a “low margin, high volume” product in how it affects sales performance. Moreover, they find that traditional media tend to initiate information diffusion and buzz building (i.e., seeding), whereas social media plays an important role in keeping the information spreading and the buzz alive (i.e., spreading).

**Research directions.** More research is needed to understand the potential synergies and complementarities between social media (or C2C interactions) and traditional media. It is likely that the two can work together as part of an integrated promotional mix within a marketing strategy, but how they work together, when they do (or do not) work well together, and what roles they fill in helping to build awareness, disseminate information, and create sales are open questions in the literature. As much of our knowledge on the interaction of advertising and C2C comes from Internet-related C2C, more research that examines offline C2C and its interaction with the use of advertising is of a specific need.

### *Modeling C2C Interactions: Agent-Based Models*

In order to explore how C2C interactions lead to profitability, researchers should take into account how individual and social network-level interactions aggregate to create market level outcomes. While many efforts had been conducted toward this end (Jackson 2008), it stays a real challenge as social systems are in fact “adaptive complex systems,” where aggregate results are not trivial to follow and may be very nonlinear and be sensitive to the starting point. Traditional straightforward analytical models may thus not be able to well capture the richness of the C2C interaction dynamics.

One of the promising tools in this regard is *agent-based models*. These models simulate a “would be world” in which customers interact with each other, so that the researcher can observe aggregate outcomes and identify C2C effects. A major advantage of such models is that they can take into account the full complexity of the relationships in the social system. Agent-based models are increasingly used across the social sciences

(Smith and Conrey, 2007; Tesfatsion 2003) and specifically used in the marketing literature to understand how C2C interactions drive aggregate market dynamics (Delre et al. 2007; Garcia 2005; Goldenberg et al. 2007; Libai, Muller, and Peres 2010; Stephen and Berger 2009). However, to produce robust agent-based models, valid assumptions on the individual-level C2C decision process should be made. Due to their relative newness, and the promising ability to fully capture C2C interactions, we discuss next some issues that need to be further addressed in this research area. However, these issues are fundamental not only for agent-based models but to the effective modeling of C2C interactions in general and thus should be of interest to a wide range of researchers interested in C2C interactions.

**The fundamental contagion process.** There are two fundamental approaches to modeling the basic contagion process. One approach follows the collective action literature whereby a contagion process will occur for an individual, only when a certain number of other people, above some personal threshold, have behaved in a certain manner (Deffuant, Huet, and Amblard 2005; Watts and Dodds 2007). An alternative approach—frequently used by marketers—is to use cascade models (Goldenberg et al. 2007; Libai, Muller, and Peres 2010). This stochastic approach follows the diffusion of innovation modeling tradition (i.e., the Bass model and its extensions). In each period, a customer has a certain probability to adopt after communications with his peers who previously adopted or due to marketing efforts such as advertising. Modelers typically choose one of the two approaches, although they had been combined when two C2C mechanisms (verbal WOM and network effects) were modeled together (Goldenberg, Libai, and Muller 2010). The distinction between the two approaches is central to the basic to the modeling of contagion processes and may affect the model’s outcome.

**Duration of C2C effects.** A second challenge concerns the extent to which an interaction has a long-lasting effect. Models typically assume that the effect of C2C interactions occurs in the same period and that this impact gradually decays over time. For example, the decay may be modeled similarly to the wear out of advertising—for example, in an exponential manner (Strang and Tuma 1993; Trusov, Bucklin, and Pauwels 2009). However, there is little empirical evidence on the subject (De Matos and Rossi 2008).

**Depth of C2C effects.** A third challenge concerns the depth of the effects of social interactions within the system. A convenient way to look at the spread of social effects is to consider an egocentric network following at the distance or degree of separation from an individual (Newman 2003). Theoretically, a C2C effect in a social system can create a cascade process with a range well beyond the first degree of separation. However, there is no consensus on how many degrees of separation should be taken into account when assessing the effects of C2C interactions. For example, customer profitability models that

account for WOM effects differ on this issue, with some modeling one or two degrees of separation while others attempting to model effects that occur deeper in the social system (Hogan, Lemon, and Libai 2004; Kumar, Petersen, and Leone 2010; Satmetrix 2008). In a public health context, it has been suggested that social effects are not noticeable after three degrees of separation (Christakis and Fowler 2009). The depth of the effect of C2C interactions on purchase behavior probably depends on network and product characteristics; yet, there is little evidence on the subject in the C2C context.

**Brand versus category effects.** Finally, further attention should be given to the modeling C2C effects at the brand versus the category level. The C2C literature has not necessarily explicitly distinguished between the brand and category level; yet, customers may be affected by others in a different manner depending on the level of the decision (Landsman and Givon 2010; Libai, Muller, and Peres 2009). It has been recently shown that the distinction between the two C2C effects can help to explain aggregate-level competitive growth (Libai, Muller, and Peres 2009). However, we still know relatively little on the interpersonal dynamics that lead to the choice of each and how they are interrelated.

**Research directions.** More empirical evidence is needed as a base for building robust agent-based models to address all four issues raised here. For example, while there is a rich literature in various disciplines using diffusion thresholds to model C2C processes (e.g., Granovetter 1978), it is mostly theoretical and lacks empirical support in the individual level. Future research should focus on empirically exploring the temporal effect and the possible decay of C2C interactions, the extent to which C2C interaction reach into higher degrees of separation, and the role of the brand versus the category in the C2C interactions.

### *The Market Outcomes of C2C Interactions*

Marketers' increased interest in C2C interactions has arisen because of the potential for C2C interactions to influence the firm's financial performance and market position. This is also a part of a larger view of customer profitability that takes into account factors beyond the purchased based only customer lifetime value (Kumar et al. 2010). This article has argued that identifying and measuring C2C interactions and linking them to business performance is a challenging task. However, in evaluating the research evidence to date, we believe that there is increasing evidence that links C2C interactions to firm profitability.

Much of the new evidence comes from analyses of online data. Online C2C had been shown to affect TV ratings (Godes and Mayzlin 2004), movies (Liu 2006), books (Chevalier and Mayzlin 2006), and customer acquisition in online networking sites (Trusov, Bucklin, and Pauwels 2009). Online data have been also used to show that C2C acquired customers may create more long-term value to the firm (Villanueva, Yoo, and Hanssens 2008). However, offline sources also support the

notion that C2C interactions influence firm profitability. Pharmaceutical marketing databases have been used to demonstrate the growing role of social contagion over the product life cycle among physicians (Manchanda, Xie, and Youn 2008). Combining complaints database and financial reports have been used to examine the effect of negative WOM on cash flows and stock prices (Luo 2009). Mobile phone databases have been used to understand how inter-customer communication drives diffusion (Kiss and Bichler 2008) and customer relationship databases to explore how WOM leads to customer acquisition (Wangenheim and Bayón 2007).

Nevertheless, there are more areas in which additional research is required to better understand the fundamental way in which C2C interactions lead to profitability. We look at three notable ones. First, C2C interactions build customer equity by helping to reduce costs. Kumar, Petersen, and Leone (2010), for example, suggest that the value of some C2C interactions could be assessed by asking the question: How much money would the firm spend on advertising to produce similar results? Similarly, online communities use customer interactions to save on call center staff that otherwise would give support to clients (Rosenbaum 2008). These savings should be formally taken into account when considering C2C results.

Second, since C2C interactions can start a chain effect, their impact can be long term, whereas most prior research has taken a short- or medium-term perspective. One way to look at the outcome of C2C interactions is to consider their comprehensive effect on the firm's customer equity, which is an overall long-term measure (Libai, Muller, and Peres 2010). Hence, we believe it would be useful for future research to consider additional aspects of C2C effect using the customer equity approach.

For example, most of the work to date has examined the effect of C2C interactions on the acquisition of new customers. It is generally recognized that C2C interactions potentially influence all aspects of purchase behavior, including purchase frequency, purchase volume, and cross-buying. However, beyond trial, researchers have typically focused on how C2C interactions facilitated by relationship marketing programs (especially loyalty programs) influence purchase behavior (e.g., Bolton, Kannan, and Bramlett 2000). Looking at other disciplines, we have more evidence that quitting certain behaviors, such as smoking, is a social phenomenon in which people are affected by their social network (Christakis and Fowler 2009). We can expect to find similar effect on customer defection from brands.

Third, a key research question is the extent to which C2C interactions lead to customer acquisition rather than purchase acceleration. At the category level, it could be argued that—if eventually customers will adopt the new product—C2C accelerates the process and so its value stems from the time value of money when accelerating cash flows. Yet, in a competitive situation, a later adoption of a product may lead to the adoption of a competitive brand. Libai, Muller, and Peres (2010) have demonstrated that in a competitive scenario, customer acceleration and acquisition combine to create the value

of C2C and that the relative power of each mechanism changes based on the competitive situation. However, further investigation is needed to examine this issue.

**Research directions.** While we see increasing evidence of the financial contribution of C2C interactions, we believe that the effect of diverse C2C interactions on the bottom line should be examined from a broader perspective. Future research should aim to focus on underexplored areas such as the effect of C2C on customer development and retention, the role of mere acceleration of customer purchases, and the role of customer mutual support, especially in online communities, in creating value to the firm. This will also enable building more informed and wider customer profitability models (Kumar et al. 2010) and in a general sense, enable us to better understand the link by which customer engagement and loyalty is translated to better and more profitable firms.

## Conclusion

It had been recently suggested that the availability of social network data will be as transformative for the social sciences as Galileo's telescope had been for the physical sciences (Baker 2009). Indeed, the exploration of the antecedents and consequences of C2C interactions is an exciting research area that has considerable implications for the ability of the firm to manage its customers. We believe that future research will generate additional insights as researchers develop a deeper conceptualization of C2C interactions and their associated theoretical mechanisms, as well as obtain access to better data and improved methods. We have outlined a number of interesting directions for future research that leverages these opportunities, and we are sure we will see much more work in this interesting research area.

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