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Virtual Customer Environments: Testing a Model of Voluntary Participation in Value Co-creation Activities

Satish Nambisan and Robert A. Baron

An increasing number of firms are hosting virtual customer environments (VCEs) to involve their customers in product development and product support activities. While the benefits to companies from hosting such VCEs are clear, another closely related issue has received far less attention: Why do customers participate voluntarily in value cocreation (here, product support) activities in such virtual customer environments? This study seeks to answer this question by developing and testing a conceptual model that draws on the uses and gratifications approach to consider an integrated set of four benefits that customers gain from their interactions in VCEs. The research model also incorporates the interaction-based antecedents of these customer benefits. Drawing on concepts and insights from the areas of computer-mediated communication and brand communities, the key characteristics of customers' interactions in the VCE are identified and related to the aforementioned four types of benefits. The study hypotheses are tested using data collected from customer participants of the VCEs of two firms, Microsoft and IBM. The dependent variable, customers' actual participation in the VCE, is operationalized as a time-lagged variable, and the data for this are sourced from the Netscan database. Results offer strong support for the model and indicate that customers' participation in product support activities in a VCE is motivated not just by their "citizenship" or norm-related behavior but stems primarily from their beliefs concerning the benefits of engaging in such activities. Results also show the impact of key interaction characteristics of VCEs on such perceived benefits and imply the need for firms to carefully design their VCEs to enhance customers' perceptions regarding potential benefits. The research model and the findings hold important implications for research and practice in customer coinnovation and product development. The model provides the basis for identifying the appropriate set of VCE design features. Companies can test the efficacy of their VCE design features by focusing on how such features augment the four types of benefits discussed and thereby ensure continued customer participation. The study findings also hold broader implications for practice in the customer relationship management area, particularly with regard to the potential to combine customers' VCE interactions with appropriate offline product-related activities and to view the VCE as an integral element of the firm's overall customer relationship management initiative.

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Introduction

The infusion of new technologies in customer–firm interactions has redefined the roles customers play in innovation and value creation

(Bitner, Brown, and Meuter, 2000; Dahan and Hauser, 2002; Sawhney, Verona, and Prandelli, 2005; Thomke and von Hippel, 2002). *Virtual customer environments* (VCE), which provide services ranging from online discussion forums to virtual design and prototyping centers, enable firms to involve their customers in product design, product testing, and product support activities (Nambisan, 2002). The strategic importance of such initiatives to co-opt customer competencies for value creation is evident (Vargo and Lusch, 2004). Consider these examples:

> Microsoft has been able to leverage the support provided by its 'expert' customers in the VCE to maintain the level of product support services without significant additional investment even as its product portfolio continued to expand in the late 1990s. Microsoft has also garnered several valuable product improvement suggestions from its VCE – for example, when it added VBA to PowerPoint 97, many of the ideas for PPT tools that originated in customer discussions of this existing product in the VCE eventually found its way into PowerPoint 2000. (Based on the first author's interview with the manager of the Microsoft MVP program in Redmond, Washington, in July 2004.)

> Ducati, the Italian motorcycle company, through its VCE (which it calls the "Tech Café"), has used the deep technical knowledge of its customers to generate numerous ideas (including mechanical and technical designs) for its next-generation products. (*Verona, Prandelli, and Sawhney, 2006*)

Similar examples from other industries (e.g., automobile, fashion, video games) make it evident that firms can derive different benefits from establishing successful VCEs (Algesheimer and Dholakia, 2006; Fuller, Bartl, and Muhlbacher, 2004; Jeppesen and Molin, 2003; Verona et al., 2006).

While the benefits to hosting companies from VCEs are clear, another closely related issue has received far less attention: Why do customers participate voluntarily in value creation (here, product support) activities in VCEs? Identifying the motivating factors—the actual or anticipated benefits to customers from participating in VCEs—is crucial from the point of view of designing such online forums to be maximally appealing to potential contributors.

The broader related question of why individuals help other individuals through their participation in electronic networks has been examined largely in the context of open-source communities (e.g., Hertel, Niedner, and Hermann, 2003; Lakhani and von Hippel, 2003) and communities of practice (e.g., Constant, Sproull, and Kiesler, 1996; Wasko and Faraj, 2005). However, unlike both open-source communities and communities of practice, the customer–firm relationships that underlie the VCE context raise unique issues and implications related to customer participation in VCEs. Further, even those studies that have examined the aforementioned question in other contexts have (1) largely been limited to conceptual work, qualitative studies, and simple correlational studies; (2) focused primarily on customers' norm-related or "citizenship" behavior; (3) considered only a few of the potential customer benefits; and (4) not examined the interaction-based roots of such benefits. As such, the development and rigorous empirical validation of a coherent, integrative theoretical framework that goes beyond the citizenship behavior perspective to address the question of customer motivation for participation in firm-hosted online forums appears to be essential.

While many different theoretical frameworks could potentially offer clues concerning the nature of these motivational factors, the "uses and gratifications" (U&G) approach (Katz, Blumler, and Gurevitch, 1974), a framework widely used in the field of communication, may be especially helpful in this regard.

BIOGRAPHICAL SKETCHES

Dr. Satish Nambisan is associate professor of technology management and strategy in the Lally School of Management at Rensselaer Polytechnic Institute. His research interest areas include new product development, innovation management, technology strategy, innovation networks, and management of information technology. He has been published in several top management journals including *Management Science*, *Academy of Management Review*, *Organization Science*, *Harvard Business Review*, *MIT Sloan Management Review*, and *Stanford Social Innovation Review*. His latest book, *The Global Brain: Your Roadmap for Innovating Faster and Smarter in a Networked World*, was published by Wharton School Publishing in 2007. He was visiting faculty in the Kellogg School of Management at Northwestern University in 2006.

Dr. Robert A. Baron earned his Ph.D. from the University of Iowa in 1968 and is the Dean R. Wellington Professor of Management at Rensselaer Polytechnic Institute. He has held faculty appointments at Purdue University, University of Minnesota, University of Texas, University of South Carolina, University of Washington, Princeton University, and Oxford University (visiting fellow, 1982). He served as program director at the National Science Foundation (1979–1981) and was appointed as visiting senior research fellow by the French Ministry of Research (2001–2002). Dr. Baron is a fellow of the American Psychological Association and a charter fellow of the Association for Psychological Science. He has published more than 100 articles and 40 chapters in edited volumes and is the author or co-author of more than 45 books in management and psychology. He holds three U.S. patents and was founder, president, and chief executive officer of Innovative Environmental Products, Inc. (1993–2000).

Briefly, the U&G model has been employed in media studies to identify the different types of benefits that can be obtained from media usage and to examine how those benefits shape such media-usage behavior (Palmgreen, 1984; Parker and Plank, 2000; Stafford, Stafford, and Schkade, 2004). It is suggested here that the four types of benefits identified by the U&G framework—cognitive, social integrative, personal integrative, and hedonic—reflect the nature of benefits customers expect to derive from their participation in VCEs. Further, it is proposed that customer perceptions regarding the extent to which the VCE offers these four benefits will shape their actual participation in VCEs.

Following Prahalad and Ramaswamy (2003), it is suggested that customer perceptions regarding the potential for deriving these four types of benefits will in turn be influenced by their actual interactions in the VCE. Drawing on concepts and insights from the areas of computer-mediated communication and brand communities, the key characteristics that describe customers' interactions in the VCE are identified as related to the previously given four types of benefits.

The study hypotheses are tested using data collected through a Web-based survey from customers involved in the VCEs of one of two firms: Microsoft or IBM. The research model and findings seek to contribute to both theory and practice. First, the study presents an integrated, theoretical model of customer motivations and their interaction-based antecedents in the VCE to provide managers with an actionable set of insights they can use to enhance customer participation in product support, and more generally, to devise and deploy virtual "innovating experience environments" (Prahalad and Ramaswamy, 2003). Second, the research question relates to the broader theme of the increasingly central role that customers play in organizational activities—a theme that places *customer* as an important focus of attention for management researchers. A rapidly emerging set of studies in the organizational literature (Dietz, Pugh, and Wiley, 2004; Goodman et al., 1995; Schneider et al., 2005) has underscored the importance of integrating organization and marketing perspectives to develop a better understanding of the nature and impact of customer involvement in organizational activities. This study builds on this theme and extends it to the online context by focusing on the motivations that underlie customer participation in one type of organizational activity, that is, product support. The next section provides the theoretical background for the study.

Theoretical Background

Customer Benefits from Participation in VCE: Uses and Gratifications Framework

The U&G framework (Katz et al., 1974) identifies four broad types of benefits that individuals can derive from media usage (in this case, from participation in VCEs): (1) cognitive benefits that relate to information acquisition and strengthening of the understanding of the environment; (2) social integrative benefits that relate to strengthening consumer's ties with relevant others; (3) personal integrative benefits that relate to strengthening the credibility, status, and confidence of the individual; and (4) hedonic or affective benefits such as those that strengthen aesthetic or pleasurable experiences. A unifying theme of the different studies that have applied the U&G framework (e.g., Palmgreen, Wenner, and Rayburn, 1981; Perse and Courtright, 1993) is their focus on consumers' *interactions* in a particular media context—interactions with the media itself and interactions with others through the media—and how such interactions gratify their different needs or create gratification opportunities (Palmgreen, 1984). Further, recent application of the framework to Internet and other computer-mediated environments (e.g., Kaye and Johnson, 2002; Parker and Plank, 2000; Stafford et al., 2004) show that while the specific nature of such benefits may depend on the context, the underlying theoretical assumptions and the broad categories are stable. Here, the primary focus is on customers' interactions in the VCE and on how the nature of these interactions shapes the benefits that are received or anticipated. As such, the U&G framework provides a useful theoretical base in this regard. The four benefit categories can be interpreted in the context of the present study as follows.

Cognitive or Learning Benefits. In the current context, cognitive benefits reflect *product-related learning*, that is, better understanding and knowledge about the products, their underlying technologies, and their usage. Like offline product communities, VCEs also hold valuable collective knowledge on the product and its usage that is generated and shared through continued customer interactions (Rothaermel and Sugiyama, 2001; Wasko and Faraj, 2000).

Social Integrative Benefits. In a VCE, the social context is defined by the participating customers and members of the host firm. Social integrative benefits

reflect the benefits deriving from the social and relational ties that develop over time among the participating entities in the VCE (Nambisan, 2002). Such social relationships provide a range of benefits to the customer, including enhancement of a sense of belongingness or social identity (Kollock, 1999). Studies on brand communities (McAlexander, Schouten, and Koening, 2002; Muniz and O'Guinn, 2001) have documented the considerable value customers place on such social identity and relationships.

Personal Integrative Benefits. Personal integrative benefits relate to gains in reputation or status and the achievement of a sense of self-efficacy (Katz et al., 1974). VCEs serve as a venue for individual customers to exhibit their product-related knowledge and problem-solving skills. By contributing to product support, customers can enhance their expertise-related status and reputation among peer customers as well as with the product vendor (Harhoff, Henkel, and von Hippel, 2003; Wasko and Faraj, 2000). Through their contributions, customers influence peer customers' product usage behavior as well as the vendor's product improvement plans, and by exercising such influence, they may realize a sense of self-efficacy (Kollock, 1999).

Hedonic Benefits. Customers' interactions in the VCE could also be a source of highly interesting and pleasurable as well as mentally stimulating experiences. First, studies on brand communities show that customers derive considerable pleasure from conversing with one another about the product, features, and the idiosyncrasies of the usage context (Muniz and O'Guinn, 2001). Such positive reactions and enjoyment, rooted in the product context, are equally applicable in VCEs too (Jeppesen and Molin, 2003). Second, the problem solving that underlies much of the interactions in a product-support focused VCE can also be a source of mental or intellectual stimulation that forms another aspect of hedonic benefits.

Thus, by leveraging the U&G framework, this study has identified a cogent set of four benefit categories that can potentially inform on customer participation in product support and are also theoretically rooted in the interactions occurring in the VCEs.

The Nature of Customers' Interactions in the VCE

Three fundamental contextual dimensions frame customers' interaction experience in the VCE: *product*

context, *community* context, and *technology mediation* (Nambisan, 2002). First, customer interactions in the VCE are primarily rooted in the context of the firm's product (i.e., interactions related to knowledge that underlies the different aspects of the product life cycle). Second, customer interactions in the VCE occur in a social or community context, a community that consists of peer customers as well as members of the host firm. Third, interactions occur in a computer-mediated environment; that is, interactions are mediated (supported/constrained) by the technological infrastructure of the VCE. By considering these three dimensions, the study identifies the key interaction characteristics salient to the context of product-support focused VCEs.

Customer interactions in the VCE vary in the nature and the level of intensity of *product-related* knowledge that is transacted (Franke and Shah, 2003; Fuller et al., 2004; Hertel et al., 2003; Wasko and Faraj, 2000). For example, interactions may relate to different types of product knowledge: product-technology knowledge, product-market knowledge, or product-use knowledge. The information exchanged may also vary in terms of complexity: high-level interactions that assume much prior knowledge about the product or low-level interactions that do not presume such prior understanding.

The second dimension emphasizes the extent to which customer interactions are situated in the community context. Prior studies on brand communities and virtual groups (e.g., Burgoon et al., 2000; Fischer, Bristor, and Gainer, 1996; McAlexander et al., 2002; Muniz and O'Guinn, 2001) have identified two characteristics as constituting the community context—the extent to which the interaction *involves* the community and the extent to which the interaction entities reveal their *identity* to others. Given that interactions in a product-support focused VCE will in general always be visible to (or involve) the community, the interaction characteristic of interest in the current study context is the extent to which members reveal their *identity*. As prior studies in computer-mediated communication (e.g., McKenna and Bargh, 1998; Walther, 1994) have shown, the salient type of identity in an online environment is not necessarily the "real-world" identity of the participating members but instead their "online" identity (which may or may not be their real-world identity). The more important issue is how consistently members maintain and reveal such an identity in their interactions (Walther, 1994), and this is the perspective that is adopted here to conceptualize member *identity* in the VCE.

The third dimension underlines the nature of technology mediation of the interactions in the VCE. Te'eni (2001) developed a metamodel of communication in computer-mediated environments that emphasized three characteristics: interactivity, channel capacity, and adaptiveness. Interactivity is the responsiveness (Rafaeli, 1988) or "the potential for immediate feedback from the receiver" (Te'eni, p. 271). It can be conceptualized as human interactivity (between customers) and machine interactivity (between a customer and the computer) (Hoffman and Novak, 1996). Channel capacity relates to the potential to transmit a high level of cues (Daft and Lengel, 1984), and adaptiveness reflects the ability to adapt a message to a particular receiver (Te'eni). In this study context, channel capacity, adaptiveness, and machine interactivity hold limited relevance since the interactions in the online product support forums are largely text based and require minimal computer navigation. However, the extent of *human interactivity* forms an important consideration here as product-related discussions and debates among the community members form the primary activity in the VCE.

Thus, in this study, the focus is on three interaction characteristics: (1) *product-related content* (extent of product-related knowledge); (2) member *identity* (extent to which customers maintain and reveal a stable identity); and (3) human *interactivity* (extent of responsiveness or rapid feedback from members). These three factors are viewed as reflecting customers' actual interaction experience in a VCE and, as such, as potentially shaping the extent of interaction-based benefits realized. Next, the research model that captures these relationships is presented.

Research Model

An overview of the research model of customer participation in VCEs is given in Figure 1.

Customer Interactions in the VCE and Customer Benefits from Participation

Given that the benefits derived by customers would likely vary with the nature of their interactions (i.e., their actual experiences in the VCE), the paper now explains how each of the three interaction characteristics—product-related content, identity, and interactivity—may be related to the four categories of benefits (or, specifically, to customers' beliefs about these benefits).

Product-Related Content and Benefits. First, it is proposed that VCE interactions that are high on *product-related content* are likely to be related to all four types of perceived benefits. This thesis underlines the fact that the fundamental basis for deriving all four benefits identified earlier is product-related interactions. The greater the extent of product-related content in the interactions (in terms of both the diversity and depth of product-related knowledge), the greater would be the opportunities to acquire information and to learn about the product, the associated technologies/features, and the usage (Hertel et al., 2003; Jeppesen and Molin, 2003). While the diverse nature of the topics discussed provides opportunities for customers to learn about various aspects of a product, the depth of topics discussed enables them to gain a more fundamental understanding of the product: learning that may lead to more effective product usage.

Similarly, in a product-based community, the primary basis for the members to relate to one another is their affiliation with the product; that is, product-related interactions or "storytelling" is crucial for customers to "identify" with peer customers and to establish the norms and values that would bind them together. In their ethnographic study of online and offline brand communities, Muniz and O'Guinn (2001) found that stories based on common experiences with the product "meaningfully link community member to community member" (p. 423). Typically, the greater the diversity of topics discussed in the VCE, the greater the number of customers who participate and, hence, the greater the number of ties that can potentially be established in the community. Similarly, the more in-depth the product-related discussions are, the greater would be the opportunity to gain a deeper mutual understanding of one another's product related issues and problems (Algesheimer, Dholakia, and Herrmann, 2005)—a mutual understanding critical to establish the "consciousness of kind" or a strong social identity of the community (McAlexander et al., 2002, p. 41). Thus, it is concluded that the greater the extent of product-related content, the greater the potential to derive the associated social integrative benefits.

Product-related content also enhances the opportunities for customers to establish or reinforce their expertise-based reputation in the community as well
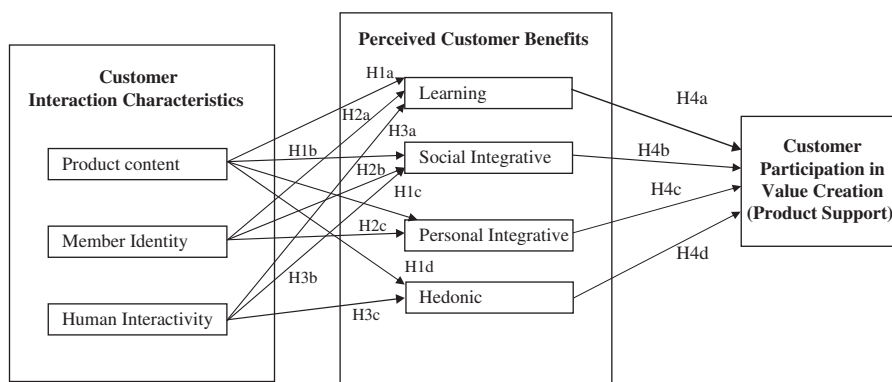
Figure 1. Hypothesized Model of Customer Participation in Value Creation in VCE[a]

[a] Control variables and their paths are not shown for the sake of clarity.

as achieve a sense of self-efficacy by influencing peer customers or the vendor. Clearly, the more in-depth and diverse the product-related issues that are discussed in the VCE, the better would be the opportunity for individual customers to demonstrate their unique knowledge or breadth of expertise (Jeppesen and Molin, 2003) and, hence, the greater the potential to enhance their product-related status in the community. Similarly, discussions that relate to complex product-usage problems provide the context for customers to suggest innovative ways of product usage (thereby influencing peer customers' product usage) as well as innovative product improvement ideas (thereby influencing the host firm's product development plans). Kollock (1999), drawing on social exchange theories (e.g., Blau, 1964), emphasized the power and sense of self-worth or self-efficacy that individual customers may feel by exercising such influence in online customer forums.

Finally, the hedonic benefits customers derive from conversing with one another are also enhanced with the nature and the depth of the product-related topics discussed. For example, in describing the Saab car customer community, Muniz and O'Guinn (2001) report that discussions on unique or arcane aspects of the product often deliver significant enjoyment to customers. In VCEs also, discussions may deliver corresponding positive reactions by satisfying customers' product-related curiosity or by providing what one of our customer interviewees called "aha" moments. For example, in describing such a reaction, the customer noted, "That was a twin aha moment—not only did I suddenly understand how the product feature worked in that (usage context), but the sheer simplicity of it provided another tinge of coool." Similarly, consider the mental or intellectual stimulation from solving product-related usage problems. In general, the

greater the depth and diversity of product-related content in the problem posed, the greater the extent of creativity and problem-solving skills required (Prahalad and Ramaswamy, 2003) and, hence, the greater the mental stimulation that the customer may experience. This is particularly true in technology-based products (e.g., computer software, consumer electronics) where the potential for diverse combinations of product features and tools present usage challenges that often require clever workarounds. As Raymond (1999) noted in his seminal essay on open source, the greater the complexity of such challenges, the greater the "technical enjoyment" derived from solving them. Thus, it is concluded that greater amounts of product-related content enhance the extent of hedonic benefits that could potentially be realized.

H1: The greater the amount of product-related content in VCE interactions, the stronger customer's beliefs that participation in VCE will yield (a) learning benefits, (b) social integrative benefits, (c) personal integrative benefits, and (d) hedonic benefits.

Member Identity and Benefits. Turning next to the member *identity* dimension, interactions high on this dimension seem likely to enhance learning, social integrative benefits, and personal integrative benefits. First, interactions in which members maintain and reveal stable identity allow customers to enhance their learning by making the associated information processing more efficient. Cues regarding the communication environment can facilitate the more efficient heuristic processing of the information (Chaiken, 1980). In the VCE context, members' consistent identity provide valuable cues on the credibility of the product-related knowledge or solution offered and

enable peer customers to rapidly process such information, thereby enhancing their overall learning effectiveness. As one customer interviewee noted, such consistent member identity revealed is particularly helpful when several potential solutions or workarounds are offered to a problem posed by a customer in the VCE, after which the customer has to decide which suggestions to try out even when their implications are not quite clear.

Second, interactions in VCEs that involve identity persistence enhance the probability of deriving gains from the social ties in the future (Kollock, 1999). Such identity persistence enhances customers' expectations regarding future interactions with peer customers. Prior studies (e.g., Walther, 1994) have shown that anticipation of future interactions in a community lead members to invest more in mutual understanding and to facilitate the creation of the social identity. This has also been evidenced in the case of brand communities (Muniz and O'Guinn, 2001). Thus, it is expected that the extent of stable identity afforded by the VCE will be related to customer perceptions about social integrative benefits.

Stable member identity is also crucial for members to derive personal integrative benefits. First, consider reputational gains. Such reputation or status is often gained by customers through a display of their product-related expertise over a period of time (Fuller et al., 2004; Jeppesen and Molin, 2003), and identity persistence is critical to establish and maintain such status. Second, interactions in which members maintain and reveal a stable identity also facilitate customers to gain a sense of self-efficacy from influencing others. In most product support contexts, customers who offer product-related solutions need to hear back from their peer customers on how well their suggestions worked or were helpful—such feedback is critical for customers to evaluate how much they influenced their peer customers' product usage. Lack of member identity in interactions will hamper the effectiveness of such feedback and thereby the opportunity to enhance self-efficacy from influencing others. Thus, it is suggested that the extent to which stable identity is revealed in interactions will be related to beliefs about potential personal integrative benefits.

The identity dimension is not expected to be related to hedonic benefits. Given the conceptualization of hedonic benefits in this study, the feeling of joy is rooted in the particular product-related issue or knowledge, and although such knowledge is delivered through interactions, the identity of the knowledge source is often not necessary to derive such pleasure. In other words, the focus is on "tickling" customers' product-related curiosity (Jeppesen and Molin, 2003; Nambisan, 2002).

H2: The greater the extent of stable member identity evidenced in the VCE, the stronger the customer's beliefs that participation in VCE will yield (a) learning benefits, (b) social integrative benefits, and (c) personal integrative benefits.

Human Interactivity and Benefits. Higher levels of human *interactivity* in the VCE are likely to bring about learning, social integrative, and hedonic benefits. First, interactivity, which implies rapid information exchange among the customers, enables capturing participants' attention and focusing it on the product-related issue under consideration, thereby facilitating an active learning process (Te'eni, 2001). Prior studies have shown that higher levels of interactivity create contexts for such active learning and enhance overall learning effectiveness (Clark and Brennan, 1991; Dennis and Kinney, 1998). Further, frequent and continuous online interactions also enhance the depth of knowledge gained on an issue (Hsu, 1996).

Interactivity is also expected to enhance potential social integrative benefits. Drawing on Shannon and Weaver's (1949) notion of feedback in communication processes, it has been shown that in the online context, interactivity enables the development of a "sense of mutual interdependence and connection" or a "feeling that they know each other" (Burgoon et al., 2000; Rafaeli and Sudweeks, 1997). In the VCE context also, rapid or frequent feedback creates the context for "active communication" (Yadav and Varadarajan, 2005) and enables customers to perceive that peer customers truly understand their particular problem, thus facilitating the development of a mutual understanding or social identity that holds the community together.

Interactivity is also likely to be associated with hedonic benefits. First, in a VCE, customers' enjoyment relates to the uniqueness of their interactive experience. Rapid back and forth of information sharing among a set of customers on an issue may help bring sudden clarity that in turn leads to aha moments, described previously. Such unique experiences that involve rapidly building on one another's inputs or contributions have been described by customers as "deeply satisfying" and "highly enjoyable." Second,

prior studies have shown that such rapid and frequent interactions also create online environments that are more "perceivable" and mentally more engaging to the participant (Burgoon et al., 2000). Consistent with this theme, research also indicates that higher levels of interactivity can facilitate mind amplification (Durlak, 1987), that is, stimulate creative thoughts and exploration of new ideas.

There is no basis to relate interactivity with personal integrative benefits. While feedback is important for both reputational gains and self-efficacy gains, quick or rapid feedback (interactivity) is much less important. Indeed, reputational gains are usually obtained over a period of time as customers consistently demonstrate their expertise. Similarly, self-efficacy gains also, while they require feedback from other customers/vendor, are not typically derived instantaneously. For example, customers may need to go back to their product-usage context and apply the solution that has been suggested before giving feedback on their usefulness.

> H3: The greater the extent of human interactivity afforded by the VCE, the stronger the customer's beliefs that participation in VCE will yield (a) learning benefits, (b) social integrative benefits, and (c) hedonic benefits.

Customer Benefits and Participation in Product Support

Finally, it is proposed that all the four benefits will motivate customers to participate in product support in the VCE. Thus, consistent with prior research pointing to the central role of beliefs in shaping behavior, it is suggested that customer beliefs regarding the four types of benefits will impact their future participation in the VCE.

> H4: Customers' beliefs regarding the four types of benefits they derive from interactions in the VCE will significantly influence their future participation in product support in the VCE.

Control Variables in the Model

The focus here has so far been on the motivational force of the personal benefits that customers may derive from their participation in VCE. Apart from such personal benefits, customers may also be influenced

by the community—and, more specifically, by the norms and values of the community—to extend help to peer customers. Such a norm-oriented or "citizenship" behavior perspective has been studied extensively through concepts such as customers' prosocial behavior and "helping the cause" (Constant et al., 1996; Hertel et al., 2003; Wasko and Faraj, 2000). Given the fairly stable findings regarding the impact of such norms on member participation, the current study controls for such effects by including customer's perceptions regarding the *community norms* on extending product-related help to peer customers in the model.

There is also a need to control for customers' perceived importance of the VCE context. Thus, the study controls for the importance of the product for the customer—*product involvement* (Zaichkowsky, 1985). Product involvement has been found to be an important construct in studying customers' online behavior (Novak, Hoffman, and Yung, 2000). In the current context, the more important the product is to a customer, potentially the more the customer feels he or she has at stake in the VCE interactions and, hence, the more likely the customer will participate in the VCE. The study also controls for customers' overall *tenure* (membership duration) in the VCE, since customers who have participated in the VCE for a long time may perceive that there is more at stake for them in maintaining their participation (Wasko and Faraj, 2000). Finally, given that VCEs are firm-hosted forums, it is likely that direct recognition from the product vendor will critically influence their future participation. A recent study (Jeppesen and Frederiksen, 2006) tested the impact of firm recognition on participation and found positive results. Thus, here, a fourth control variable, *title*, is also included to capture whether customers have been explicitly recognized with special titles or positions for their contributions in the VCE.

Method

Data and Measures

Data were collected through a Web-based questionnaire survey. Participants in the study were customers of one of two firms, Microsoft or IBM, who were members of the firms' VCEs. In both the firms, the nature of the VCE was online forums for customers to provide product-support services to peer customers.

The predominant nature of exchanges involved customers answering peer customers' product-related queries and offering suggestions on product usage. Table 1 provides additional details about the survey respondents.

The study participants were identified using *Netscan* (http://netscan.research.Microsoft.com), a tool available in the public domain to mine data on online product forums. A total of 1,155 customers were identified who had participated in the online product forums of the two firms in the month prior to the data collection. Of the 1,155 customers, 825 were from Microsoft and 330 from IBM. Each customer was sent an e-mail requesting his or her participation in the study along with details on the survey including the website address. The e-mail requested the customer to answer the survey questions in terms of their interactions in the online product forum of the firm (Microsoft or IBM as the case may be). A reminder e-mail was sent two weeks later. A total of 181 responses were received (an overall response rate of 15.6%)— 137 customers from Microsoft and 44 from IBM. Of these, 29 responses could not be included in the analysis due to missing data. Thus, a final sample of 152 responses—121 from Microsoft and 31 from IBM— was accepted for analysis.

Two types of analyses were conducted to test for nonresponse bias (Armstrong and Overton, 1977). The first analysis compared the respondents and nonrespondents on three characteristics—firm affiliation, tenure, and participation—and independent sample t-tests revealed no significant differences between the two groups ($p = .13, .11, .22$, respectively). In the second analysis, the respondents were divided into two groups based on the median date of completion of the survey. Comparison of these two groups on firm affiliation, tenure, product involvement, and participation showed no statistically significant differences ($p = .14, .17, .13, .12$, respectively). Accordingly, nonresponse bias should not be a problem in this study.

The measures for the study constructs were either adapted from existing scales (to fit the study context) or created based on prior studies and on interviews with customers. We conducted in-depth interviews with a set of 36 customers (who had participated in these same VCEs operated by Microsoft and IBM). The interview questions related to their experiences in the VCE (e.g., the nature of their participation, interactions) as well as their perceptions about the firm, product, and customer community. Description of their interaction experience brought out several of the perceived benefits; these benefits were followed up by requesting them to comment on, for example, their learning and social relationships. The customer interviews were used to generate an initial set of items for the new scales that were created for this study. The items were then refined based on prior related studies (where relevant).

The dependent variable, *participation*, was measured as the number of actual postings related to product support (e.g., response to product-related queries) made by the customer in the online product

Table 1. Description of the Study Respondents[a]

Characteristic	Microsoft	IBM	Overall
	121	31	152
Age (in Years)	28.7	25.9	28.2
Gender (Ratio of Male to Female)	79%:21%	77%:23%	78%:22%
Education			
Master's and Higher	35%	31%	34%
Bachelor's	48%	43%	47%
High school and other	17%	26%	19%
Tenure (in Years)	1.52	1.34	1.48
Employment Industry			
Software/Computer	27%	19%	25%
Other Manufacturing	17%	20%	17%
Other Service and Miscellaneous	53%	48%	51%
Position			
Managerial	21%	13%	19%
Technical	28%	24%	27%
Other	48%	57%	49%
Number of Visits Per Week	3.27	3.1	3.24
Average Time Spent Per Visit (Hours)	0.42	0.32	0.4

[a] Some of these figures may not add up to 100% due to gaps in self-reported data.

forum in the one month following the completion of the survey. These objective data on participation were obtained using the *Netscan* database.

The Appendix lists the measures used and their sources for all the study constructs. The survey questionnaire, thus developed, was then subjected to a pilot test using a sample of 26 graduate students who were members of one or more online product forums. Analysis of the pilot test data provided preliminary support for the reliability and validity of the scales. The pilot test subjects also provided descriptive comments on the survey (e.g., on the ambiguity of item descriptions) that were used to further refine the item wordings.

Analyses

The research model used for this study (*interaction characteristics* → *customer benefits* → *participation*) called for a test of mediation effects. There are two approaches suggested in the literature to test for mediation effects (James, Mulaik, and Brett, 2004): the structural equation modeling (SEM) approach (James and Brett, 1984) and the Baron and Kenny (1986) approach, which is usually done using hierarchical regression analysis. In the present context, it was decided to use the SEM approach to test the model. This decision was based on two issues. The first issue related to the relative inappropriateness of the Baron and Kenny approach for testing full mediation models. Second, here, there is a need to conduct a simultaneous test of the significance of both the path from an initial variable to a mediator and the path from the mediator to an outcome—for such tests, the SEM approach is considered to provide (relative to Baron and Kenny) a better balance of type I error rates and statistical power (Schneider et al., 2005).

The hypothesized model was tested using the Amos 5.0 structural equation modeling program (Arbuckle and Wothke, 1999). The study adopted the following two-step analysis approach (Anderson and Gerbing, 1988). In the first stage, the measurement model was analyzed to evaluate the reliability and validity of the constructs. In the second stage, the structural model was evaluated. Given that the sample size was relatively modest, path analysis was conducted with the manifest variables. A path analysis with aggregated scores or manifest variables (rather than latent variables) yields models with fewer parameters to estimate and reasonable ratios of cases to parameters. Such an

approach is suggested for contexts with relatively modest sample size (Cudeck, 1989) and has been followed in prior studies (e.g., Aquino et al., 1997; Schneider et al., 2005). Finally, following Anderson and Gerbing's recommendations, a sequence of nested models were fitted to the data, and their extent of fit was compared with that of the hypothesized model to identify the best fitting model.

Results

Measurement Model Evaluation

A confirmatory factor analysis was conducted on the measurement model to check for internal consistency and discriminant validity. The measurement model fit the data well: $\chi^2 = 39.1$; df = 23; $p < .01$; goodness of fit (GFI) = .97; normative fit index (NFI) = .91; comparative fit index (CFI) = .93; root mean square error of approximation (RMSEA) = 0.049. Table 2 shows the mean, reliabilities, and correlations between the constructs.

Internal Consistency. Two indicators of internal consistency were considered. The first indicator, the reliability coefficient (composite reliability), ranged from .76 to .93, exceeding the recommended minimum of .70 (Fornell and Larcker, 1981) (see Table 2). The second indicator of internal consistency is the average variance extracted, that is, the amount of variance captured by a construct's measure relative to random measurement error (ibid.). As Table 2 shows, the values ranged from .64 to .72, exceeding the recommended minimum of .50 (Bagozzi and Yi, 1988). Thus, all of the constructs demonstrated good internal consistency.

Discriminant Validity. The standardized item loadings for the constructs ranged from .74 to .89 (see the Appendix), exceeding the recommended minimum of .70 (Fornell and Larcker, 1981). Another indicator of discriminant validity is when the variance extracted for each construct is higher than the squared correlation between the constructs (ibid.). Each pair of constructs in the measurement model were compared, and it was found that all constructs satisfy this criterion for discriminant validity. Also, all of the correlations among the latent constructs were found to be significantly less than one (Bagozzi and Yi., 1988),

Table 2. Means, Standard Deviations, Internal Consistency Statistics, and Correlations[a]

	Variable	Mean	s.d.	ρ_c[b]	ρ_{ve}[c]	1	2	3	4	5	6	7	8	9	10	11	12
1	Participation	12.21	0.67	NA	NA												
2	Product Content	2.99	0.94	.82	..67	0.12*	1										
3	Identity	4.11	0.56	.78	.65	0.22*	0.05	1									
4	Interactivity	2.57	0.63	.76	.64	0.23*	0.09	0.10	1								
5	Learning	4.32	0.84	.86	.69	0.13*	0.34**	0.09	0.08	1							
6	Social	3.18	1.12	.80	.70	0.20*	0.21*	0.08	0.19	0.09	1						
7	Personal	3.82	1.03	.93	.72	0.15*	0.09	0.19*	0.00	0.09	0.12	1					
8	Hedonic	3.26	1.06	.83	.66	0.12	0.32**	0.01	0.27*	0.03	0.07	0.00	1				
9	Community Norms	3.41	0.73	.82	.63	.15*	0.12	0.07	0.10	0.05	0.12	0.01	0.06	1			
10	Product Involvement	3.21	0.58	.84	.68	0.13	0.04	0.09	0.02	0.13	0.04	0.04	0.06	0.14	1		
11	Tenure	1.48	1.67	NA	NA	0.09*	0.05	0.07	0.01	0.02	0.06	0.11	0.03	0.05	0.08	1	
12	Title	0.13	0.67	NA	NA	0.09	0.01	0.05	0.07	0.01	0.03	0.09	0.02	0.05	0.08	0.09	1

[a] $n = 152$.
[b] Composite reliability coefficient.
[c] Average variance extracted.
* $p < .05$.
** $p < .01$.

thus providing further evidence of the discriminant validity of the measures used.

Nested Model Tests

The hypothesized model fit the data well ($\chi^2 = 53.4$; df = 47; $p < .01$; GFI = .97; NFI = .97; CFI = .95; RMSEA = 0.045). Data from the customers of the two firms were pooled for the analyses. A dummy variable used to capture the firm affiliation of the respondent was included in the analysis and was not significant. The study used the change in chi-square tests (Bentler and Bonnet, 1980) to compare the hypothesized model with alternate nested models (Table 3). The first objective was to test the implied null hypotheses involving the interaction characteristics and the benefits. Thus, the hypothesized model was compared with a saturated fully mediated model (SFM) that specified all 12 paths between the three interac-

tion characteristics and the four benefits, in addition to the direct paths from the four benefits to the dependent variable, *participation*. SFM had relatively worse fit than the hypothesized model and, hence, was rejected.

The next objective was to test whether the impact of the interaction characteristics on participation was fully mediated by the benefit variables as implied by the model. For this, two partially mediated models (PMs) were considered. The first analysis related to a partially mediated model that specified all the paths in the hypothesized model as well as the direct paths from the three interaction variables to the dependent variable. PM produced a good fit with the data ($\chi^2 = 38.2$ (n.s.); df = 44; GFI = .97; NFI = .96; CFI = .96; RMSEA = 0.047) and was significantly better than the hypothesized model ($\Delta\chi^2 = 15.2$; Δdf = 3; $p < .01$). PM was therefore retained as the best-fitting model. This model was then compared with a saturated partially mediated model (SPM) that

Table 3. Structural Equation Modeling Analysis Results: Model Fit Measures and Nested Model Comparisons[a]

Model	χ^2 (df)	RMSEA	GFI	CFI	NFI	$\Delta\chi^2$	Model Comparisons
Hypothesized model (H)[b]	53.4* (47)	0.045	0.97	0.95	0.97		
Saturated fully mediated model (SFM)	78.91* (31)	0.080	0.90	0.89	0.88	− 25.51*	SFM compared with hypothesized model H
Partially mediated model (PM)	38.2[c] (44)	0.047	0.97	0.96	0.96	15.2*	PM compared with hypothesized model H
Saturated partially mediated model (SPM)	88.01* (27)	0.079	0.88	0.91	0.90	− 49.81*	SPM compared with hypothesized model PM
Nonmediated model (NM)	293.1* (53)	0.183	0.42	0.56	0.61	− 254.9*	NM compared with PM

[a] RMSEA, root mean square error of approximation. GFI, goodness of fit index. CFI, comparative fit index. NFI, normative fit index.
[b] A "control variables only" null model was also compared with, and found to fit worse than, the hypothesized model H.
[c] Values are not significant
* $p < .05$.

specified all the paths as in the saturated fully mediated model as well as the direct paths from the interaction variables to participation. SPM had relatively worse fit than PM and was dropped.

Lastly, a nonmediated model (NM) was also tested. In NM, the paths from the three interaction variables to the four benefits variables were constrained to zero, but the paths from the interaction variables to the dependent variable, participation, were freely estimated. NM fit significantly worse than the PM, and it was hence rejected. The aforementioned model comparisons indicated that the partially mediated model (which included the hypothesized effects *plus* the direct effect of interactivity on participation) was the best-fitting model and was retained. Thus, here the PM is interpreted to examine the validity of the study hypotheses.

Hypothesis Tests

Examination of the standardized parameter estimates indicated that 11 of the 14 hypothesized relationships were significant and in the predicated directions. Hypotheses H1–H3 relate the three interaction characteristics to the four customer benefit constructs. With regard to H1, statistically significant parameter estimates were found for paths between product-related content and three of the four benefits—learning, social integrative, and hedonic ($\beta = .31$, $.29$, and $.41$, respectively; all $p < .001$). H1c (relationship with personal integrative benefits) was not supported. H2a (relationship between identity and learning) was not supported, whereas H2b and H2c (relationship with social integrative and with personal integrative benefits, respectively) were supported ($\beta = .26$, $.31$; both $p < .01$). Similarly, H3a (relationship between interactivity and learning) was not supported, whereas H3b and H3c (with social integrative and with hedonic benefits, respectively) were supported ($\beta = .25$; $.32$; both $p < .01$). H4 related the four perceived benefits to actual participation in the VCE. Results supported all four hypotheses: H4a, H4b, H4c, and H4d ($\beta = .25$, $p < .001$; $\beta = .20$, $p < .01$; $\beta = .17$, $p < .01$; and $\beta = .23$, $p < .001$, respectively). Thus, consistent with initial predictions, the greater the benefits perceived by customers in VCEs, the greater their actual participation in such forums. Although not hypothesized, an additional significant path estimate was observed in PM. Specifically, *interactivity* was found to directly influence participation ($\beta = .13$; $p < .01$). Finally, of the

four control variables tested, two were found to be significant. *Community norms* was found to be positively associated with participation ($\beta = .17$, $p < .001$). Customer's *tenure* was also positively associated with participation, albeit with less strength ($\beta = .07$, $p < .05$). Thus, overall, with 11 (of 14) of the study predictions supported, the results broadly support the thesis that customer's interaction experience in the VCE will shape their perceived benefits from participation and that benefits impact actual participation in product support.

Discussion

Research Contributions

The present research, and the model from which it derives, are strongly focused on one specific why question: *Why do customers voluntarily participate in and contribute to firm-managed online forums or VCEs?* While there may be several competing perspectives or explanations for customer behavior, this study's data suggest that a benefits-based perspective does have considerable merit in this discussion.

Going beyond "Citizenship" Behavior toward an Integrated Benefits Framework. One perspective that has perhaps been dominant in the online community literature is the one relating to citizenship behavior. Starting from early studies such as Constant et al. (1996), there has been considerable recognition of the fact that individuals assist others (often strangers) with little or no expectation of direct or immediate recompense (the "kindness of strangers"). In the organizational literature, such "helping" actions when they occur in work settings have been termed organizational citizenship behavior (OCB) (e.g., Podsakoff et al., 2000), and such a perspective has been validated in the context of online communities of practice (e.g., Wasko and Faraj, 2005). While the current study findings on the impact of community norms (norms and values regarding helping peer customers in VCEs) are consistent with the aforementioned perspective, the present authors believe it is not the only explanation and that continued, effortful participation in VCEs would be unlikely to derive solely from such tendencies or motives. The basic assumption here is that these customers must expect to gain some kind of benefit from such participation and that these expected benefits in turn can strongly influence their

future participation in VCEs. The study results, as already noted, offer support for this view: Several benefits that customers' anticipated from participating in the VCE are, indeed, significantly related to their actual participation in the VCE.

The study findings make several contributions toward developing and validating such a benefits-based perspective. First, the relatively strong findings regarding the impact of all four benefits on actual customer participation provide broad overall support for the benefits-based perspective. Second, the study framework, rooted in the interactions-based logic of the U&G approach, has enabled all the major types of benefits that have been identified in prior qualitative studies to be captured and for them to be integrated in a theoretically coherent and concise manner. The integrated framework of customer benefits developed here can be easily applied in other contexts of customer value cocreation (e.g., in product design) (Jeppesen and Frederiksen, 2006). Further, the focus here has been on the impact on future participation in product support; however, the relevance of the benefits framework in other customer coproduction settings indicate the potential to use it to study the impact of customer involvement in organizational activities on other aspects of customer attitudes and behavior (e.g., customer–firm relationship, customer satisfaction; Goodman et al., 1995). Third, by considering the four broad benefit categories together (rather than selectively focusing on one or two benefits as has been the case in prior studies), this study is able to show that these different benefits individually and separately shape customers' participation behavior. Overall, the study findings are consistent with the view that customers do not participate in these online forums purely on the basis of "altruistic" or "citizenship" motives; rather, they expect—and reasonably so—to attain significant benefits from such participation (enhanced product knowledge, communication with other knowledgeable customers, enhanced reputation, and cognitive stimulation and enjoyment).

Understanding the "Interactions-Based" Roots of Customer Benefits. A question that naturally follows from the study findings regarding the relevance of the benefits-based perspective is what are the factors that shape these benefits, or specifically, customers' expectations of such benefits? The study findings also speak to this question. Heeding Prahalad and Ramaswamy's (2003) call to focus on customers' value cocreation experience to understand customer motivations, this study considered the nature of customers' interactions in the VCE. Such an interaction focus has a natural fit with the present benefits framework as it is based on the U&G approach (which, in turn, has roots in user interactions with, for example, the media and technology). This also forms a unique contribution of the current study as none of the prior studies have focused on the interaction-based antecedents of customer benefits.

In this study, all three interaction characteristics (product content, identity, and interactivity) had significant and predicted effects on one or more dimensions of the benefits framework, thus providing broad support for and indicating the overall promise of the aforementioned approach. H1, H2, and H3, which predicted relationships between VCE product content, member identity, and interactivity on the one hand and customers' expectations of various benefits on the other were generally confirmed.

As the following three customer quotes (from this study's interviews) indicate, customers do perceive the potential for the various benefits based on the nature of their interactions and these perceptions do shape their participation:

> *The more technical and difficult the product-related problem is, the more eager I am (to contribute) . . . not only is the problem-solving enjoyable and satisfying, but it also gives me an opportunity to learn more intricate aspects regarding the product.*

> *I value the camaraderie that exists here (in the VCE) . . . many people are very knowledgeable and genuinely interested (in the product) and the friendly give-and-take that goes on here is what really keeps getting me back here.*

> *The interaction that gave me the most satisfaction and happiness was the one which I followed up with a (peer) customer over the course of several days to fine-tune a solution to a specific problem. One Toronto user, who was a layout editor at the Globe & Mail, was trying to set up a Word template for his parish bulletin that would be easy for his priest to use. He had the design concept figured out but was having problems with a lot of the details. I was able to work with him over the course of a week or so to finally come up with a product that he thought the priest could use and that would "knock the archbishop's little red socks off." Although I had expended much energy and time, I derived the most happiness and pleasure in successfully solving the problem and helping him.*

Some of the predicted relationships were not validated—for example, product-related content was not found to be associated with personal integrative benefits. Apart from sample-specific reasons, the lack of support may also indicate the role of other factors that have not been considered here. Specifically, there could be individual characteristics of customers that moderate or otherwise influence the impact of interactions on perceived benefits. For example, even high levels of product-related content might not enhance perceptions regarding the potential for personal integrative benefits for individuals who have poor knowledge about the product domain or who have low preexisting self-esteem. Such customer-specific factors were beyond the scope of the current study; however, consideration of such factors in the future may bring further clarity to the findings and is discussed briefly later.

Direct Impact of Interactivity. While in general characteristics of the VCE (product content, customer identity, interactivity) influenced customer participation through their effects on customers' anticipation of the four types of benefits, the study found that interactivity in the VCE also directly influenced the actual participation.

This finding offers support for recent reports in the computer-mediated communication area on the effect that the design characteristics of virtual environments have on the interaction behavior of the participant. For example, the application and extension of social presence theory in the online environment has indicated that communication characteristics such as interactivity and adaptiveness could impact a user's evaluation of the virtual environment and his or her online behavior (Kumar and Benbasat, 2002). Social presence is the extent to which a medium is perceived as conveying the presence of the communicating individuals (Short, Williams, and Christie, 1976). In particular, such characteristics of a product-oriented website have been related to factors such as trust, usefulness, and purchase intentions (Geffen and Straub, 2004; Kumar and Benbasat) as well as to online consumer behavior (Novak et al., 2000). The current study is consistent with these reports and, importantly, extends the implications to online customer behavior in a different context, namely, their participation in product support.

Finally, the positive findings regarding tenure (the length of time customers have spent in VCEs) indicate that, as predicted, participants do feel a greater extent of stake in their interactions the longer they retain their membership in the community, and hence it fuels their future participation. On the other hand, product involvement (the perceived importance of the product) and firm recognition (title) were not found to shape participation. Both these results may to some extent be explained by the nature of the study context. Software products are definitely useful and important in many user contexts. However, the nature of importance customers assign to such software products is likely to be different from what they would assign to more personal consumer products (e.g., digital camera, iPod, smart phone, car), and this may also extend to the value they place on firm recognition. Another possible explanation relates to the product support context of this study. It may be that since product support is peer customer focused, firm recognition may play a less important role here, whereas in other coinnovation contexts (e.g., product design), customer contributions may be more firm focused (rather than peer customer focused), and thus firm recognition may assume greater importance there. For example, Jeppesen and Frederiksen (2006) found firm recognition to be an important motivator of customer participation in product-design activities in the context of computer-controlled musical instrument products. Future validation of this model in other product and other customer coinnovation contexts may clarify this.

Managerial Implications

The study model and findings have several important implications for organizations wishing to involve customers in product support and other such activities in VCEs. The first implication is that firms should fully acknowledge the importance of benefits to customers. Many organizations assume that customers' altruistic feelings drive their participation in VCEs. Recent discussions of open-source and other such communities of creation (Sawhney and Prandelli, 2000)—where individuals help other individuals seemingly without any expectations—have only further emboldened such assumptions. This has resulted in many organizations adopting a ''when we build it, they will come'' approach toward VCEs—in other words, if the technological infrastructure is put together for an online forum, customers will come and support one another endlessly. The implication is that companies do not need to invest additional resources in such

initiatives (other than the basic technological infra-structure). The study findings do not support this perspective; rather, they suggest that customers' active participation in VCEs is strongly influenced by their beliefs concerning benefits they will receive from engaging in such activities.

This, in turn, suggests that firms, interested in obtaining such assistance from customers, must take proactive measures to create and sustain online environments that would contribute toward such benefits. This may mean, for example, new organizational units, new organizational roles, and new customer management strategies to manage the VCE. For example, Microsoft has been one the first companies to realize this and to establish a separate unit (the MVP Program office) to manage its VCE initiatives. Similarly, other firms (e.g., Procter & Gamble [P&G], Volvo) have established new positions such as community manager and customer liaison manager to coordinate VCE activities and to enhance the potential for customer benefits. Such actions in themselves show the commitment of the organization to create a win-win situation in the VCE where it is not just the firm that is benefiting but also the customers.

A second implication of the findings concerns the design of the VCE. Specifically, our results suggest that such VCEs should be carefully designed so as to provide all four types of benefits discussed here, and the three interaction characteristics mentioned earlier (product content, stable member identity, and interactivity) indicate the basis for incorporating such design features. Recent studies indicate several practical considerations in this regard. For example, it is evident that companies need to focus on enhancing both the breadth and depth of product-related content in customer interactions and also in making such content more accessible to customers. Consider technology interfaces or tools to visualize and mine the interactions in the VCE. New semantic visualization tools for online communities enable members to visualize the patterns in the customer conversations, navigate toward the content-rich part of the conversations, and gain a better sense of the meaning and relevance of the different interactions (Donath, 2002). Similarly, online community mining tools (e.g., *Netscan*) enable customers to develop a better understanding of the other participants and the overall online social environment—and to facilitate maintaining stable member identities and more interactive and coherent conversations (Erickson et al., 2002; Smith, 2002).

In addition to technology-based tools, there are other design features that support or enhance the interaction characteristics (and thereby the benefits) discussed here. One such design feature is the involvement of employees of the firm in the online forum discussions. For example, Microsoft has designated employees (called buddies) assigned to participate in the online discussion forums of the different product groups. Similarly, SAP Inc. holds events such as "ask-the-expert" discussions in its VCE that bring together company "insiders" and customers to conduct conversations on a wide range of product-related issues. Companies such as Peugeot and Volvo bring their design experts and internal "technological evangelists" as visitors to the VCEs. The involvement of such employees achieves two things. First, they bring more intricate or richer product knowledge to the conversations and thereby enhance the overall product content in the VCE (Fuller et al., 2004). Further, their presence often enhances the overall interactivity in the forum through active and involved discussions on, for example, new design features and new technologies. Similarly, recent studies have also shown the promise of "gated" subcommunities that can be formed within the larger online customer forum based on customer interests or expertise. For example, Microsoft has created a separate online forum for its expert customers, whereas companies such as Peugeot and Diesel have created separate online forums for customers with specific product interests (Verona et al., 2006). The objective is to create "exclusive" contexts that facilitate more open sharing of product-related knowledge.

The objective here is not to provide an exhaustive list of the design features but rather to indicate how our research model and findings provide the basis for identifying the appropriate set of VCE design features. The model also clarifies how companies can test the efficacy of VCE design features by focusing on how such design features augment the four types of benefits discussed and thereby ensure continued customer participation.

The study also holds broader implications for practice in the customer relationship management area. Specifically, given the present findings regarding the importance of the four types of benefits, companies should seek to determine how they can further enhance such benefits by combining customers' VCE interactions with appropriate offline product-related activities and interactions. For example, by combining VCE activities with offline activities such as

"expert customer" summits (e.g., Microsoft's MVP summit) and product launch parties, companies can facilitate the transfer of knowledge from offline to online contexts thereby influencing the perceived benefits. In short, as McWilliam (2000) suggested, VCEs can be viewed as an integral element of the firm's overall customer relationship management initiative. Such an approach would allow firms to capture the potential synergies between online and offline interactions in a way that benefits both customers as well as the firm.

Conclusions and Directions for Future Research

Before concluding it is important to mention certain limitations of the present research. Some of these limitations actually point to promising directions for future research. The first set of limitations relate to the nature of the study context. This study was conducted in the context of an online product support forum—and, thus, the insights gained here largely apply to the context of customer involvement in product support services. Further, the study data were collected in the context of technology-based product (i.e., software), and, as such, generalizations of the findings to other product contexts should be performed with care.

Given the scope of the study, there are several other customer-related variables that were not included in the model. This represents both a limitation of the current study as well as an opportunity for future research. First, customer psychological variables such as customer's need for recognition, achievement motivation, and preexisting self-efficacy may play a role in moderating the impact of customers' VCE interactions on future participation behavior. Such variables were not considered here. Second, the study also did not consider customers' interactions outside the VCE. It is quite likely that customers' participation in the VCE will be influenced by external interactions (with, e.g., the product, the host firm). To the extent that the above issues are valid here, some of the paths in the model may have been inflated, and some potential interaction effects may have been overlooked.

Finally, an additional avenue for future research relates to the impact of customers' VCE interactions on the nature of customers' relationships with the organization. In other words, can customer participation in the VCE lead to significantly different "psychological contracts" (Rousseau and Parks,

1993) between the two entities? The framework presented here can be used to examine the aforementioned issue and to enhance our understanding of the broader impact of customer involvement in organizational activities (Goodman et al., 1995).

In conclusion, despite the limitations noted here, the present study offers new insights into the reasons why customers choose to participate in VCE forums. Overall, the study results suggest that they participate in such activities because of the benefits they expect to receive from doing so. This is not to imply that the "milk of human kindness" is missing from VCEs—on the contrary, these findings concerning the impact of community norms suggest that such motives and variables may indeed play a role. However, these findings also suggest that such forums should be designed so as to maximize potential benefits to customers for their participation; if they do not, customers' motivation to participate in them may decrease or even vanish. As P.D. James, a well-known author once put it, "Human kindness is like a defective tap; the first gush may be impressive but the stream soon dries up" (James, 1989, p. 352). In the present authors' view, designers of VCE's would do well to heed these words and to design the online forums so as to assure that customers anticipate significant, potential benefits from their participation.

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Appendix. Summary of Measures and Item Loadings

Construct Items	(Item Loading)[a]

Note: Unless indicated otherwise, the items were measured using a five-point Likert scale, anchored by 1 = strongly disagree and 5 = strongly agree.

"Each of the following statements relates to the nature of your interactions in the online forum. The first three items relates to the product-related content, the next two items relate to the identity you maintain in the online forum, and the last three items relate to the timing of the interactions. For each item, please mark the box that best describes your interaction."

1. *Product Content*: (three-item scale based on customer interviews; Fuller, Bartl, and Muhlbacher, 2004; Hertel, Niedner, and Hermann, 2003; Wasko and Faraj, 2000)
   (a) Amount of information about product usage (e.g., features, updates) contained in my interactions is very large. (.85[*])
   (b) Amount of information about product technology (e.g., standards) contained in my interactions is very large. (.82[*])
   (c) Amount of information about product market (e.g., competing products, complementary products, pricing) contained in my interactions is very large. (.81[*])

2. *Member Identity*: (two-item scale based on Burgoon et al., 2000; Te'eni, 2001)
   (a) I reveal my identity in all of my interactions. (.82[*])
   (b) I am always aware of the identity of the person I am interacting with. (.79[*])

3. *Human Interactivity*: (three-item scale based on Burgoon et al., 2000; Te'eni, 2001)
   (a) Much of my interactions are asynchronous in nature. (.74[*])[b]
   (b) I generally receive quick reaction/feedback from other customer members on my ideas and contributions. (.82[*])
   (c) I generally receive quick reaction/feedback from the product vendor on my ideas and contribution. (.80[*])

"The following items relate to the varied benefits you can obtain from your participation in the online forum. Please indicate the extent to which you believe you can derive each by marking the appropriate box."

4. *Learning*: (three-item scale based on customer interviews; Franke and Shah, 2003; Hertel et al., 2003; Wasko and Faraj, [2000])
   (a) Enhance my knowledge about the product and its usage. (.89[*])
   (b) Obtain solutions to specific product-usage related problems. (.85[*])
   (c) Enhance my knowledge about advances in product, related products, and technology. (.82[*])

Appendix. (Contd.)

Construct Items	(Item Loading)[a]

5. *Social Integrative*: (three-item scale based on customer interviews from Kollock, 1999; Wasko and Faraj, 2000)
  (a) Expand my personal/social network. (.79[*])
  (b) Enhance the strength of my affiliation with the customer community. (.83[*])
  (c) Enhance my sense of belongingness with this community. (.82[*])

6. *Personal Integrative*: (four-item scale based on customer interviews; Kollock, 1999; Hertel et al., 2003)
  (a) Enhance my status/reputation as product expert in the community. (.84[*])
  (b) Reinforce my product-related credibility/authority in the community. (.82[*])
  (c) Derive satisfaction from influencing product usage by other customers. (.77[*])
  (d) Derive satisfaction from influencing product design and development. (.78[*])

7. *Hedonic*: (four-item scale based on customer interviews; Franke and Shah, 2003; Hertel et al., 2003)
  (a) Spend some enjoyable and relaxing time. (.82[*])
  (b) Derive fun and pleasure. (.84[*])
  (c) Entertain and stimulate my mind. (.81[*])
  (d) Derive enjoyment from problem solving, idea generation, etc. (.80[*])

Dependent Variable

8. *Participation:* Number of customer postings in the VCE (source: Netscan database)

Control Variables

9. *Product Involvement*: (five-item scale from Novak, Hoffman, and Yung, 2000)
Please rate the product along these dimensions:
  (a) Unimportant/important. (.78[*])
  (b) Irrelevant/relevant. (.82[*])
  (c) Means a lot to me/means nothing to me. (.85[*])[b]
  (d) Matters to me/doesn't matter to me. (.86[*])[b]
  (e) Of no concern to me/of concern to me. (.89[*])

10. *Community Norms*: (four-item scale based on customer interviews; Constant, Sproull, and Kiesler, 1996; Dholakia, Bagozzi, and Pearo, 2004)
Please indicate whether you agree/disagree with each of the following statements:
Members of this community place considerable value:
(a) In helping others by promptly answering their product related problems. (.83[*])
(b) In offering innovative product ideas and suggestions to the product vendor. (.81[*])
(c) Being a responsible and contributing member of the community. (.84[*])
(d) Consistently offering constructive ideas and suggestions on product usage to other members. (.85[*])

11. *Tenure*: In number of years.

12. *Title*: 0 = title not awarded; 1 = title awarded.

[a] Standardized item loadings are reported.
[b] Reverse coded.
[*] $p < .001$.