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ABSTRACT

User generated content is being recognized as part of the value proposition of e-commerce organizations. To make available fresh content on topics with existing contributions and first-time content on topics with little or no existing content, one needs to understand why individuals contribute early or late. Drawing upon the cognitive model of helping, this study develops and tests three hypotheses based on a survey and archival data of 235 contributors of reviews at Amazon.com. Results of an SEM analysis using LISREL indicate that self-perceived competence is positively associated with early contributions whereas an individual's social adjustive motive toward others in general leads to late contributions. In contrast, people for whom the social adjustive motive toward specific others is salient are neither likely to contribute consistently early nor late. These findings suggest ways for site administrators to ensure a balanced coverage across topics by addressing these individual factors.

Keywords

Online contexts, product reviews, earliness of contribution, cognitive model of helping, survey, LISREL

INTRODUCTION

User generated content is being recognized as part of the value proposition of e-commerce organizations (Cook, 2008). Whether in the form of posts by users helping others trouble-shoot product-related issues (e.g., the HP support forum) or reviews submitted by customers on products and services (e.g., tripadvisor.com), content at such sites is sought by many people. A typical online context has many topics or domains that are being added over time. For example, the product review site at Amazon.com has pages devoted to each of the products sold there. However, depending on when a topic became available for contribution and on the choices of the individual contributors, some topics have a large number of contributions, others have only a few and many have none at all. We define the *earliness of an individual contribution* as its chronological position in the sequence of contributions on a given topic. The fewer the number of existing contributions by others, the earlier is that contribution. For an individual contributor, the *propensity to contribute early content* is the overall tendency of the individual to contribute early across all contributions submitted by him or her. Apart from need to populate a wide cross-section of topics, the earliness and lateness of contributions by individual contributors is relevant to administrators of product review sites due to word-of-mouth effects on sales (Li and Hitt, 2008).

An individual contributor plays an important role in ensuring a wide coverage of content on the topics at an online context. When he or she arrives at a domain in an online context, the individual is faced with no existing content, some existing content or many existing contributions. Some may tend to contribute when there are fewer existing contributions and thus be early in the sequence of contributions. Others may like to contribute only where they see many existing contributions and thus end up being late in the chronological order. Still others may be indifferent to the number of existing contributions. Studies of online contexts (e.g., Constant, Sproull and Kiesler, 1996; Wasko and Faraj, 2005) have uncovered a rich set of individual and social motivational factors that influence aspects of contribution such as one's intention, frequency or amount of contribution. However, findings from prior research do not discriminate between early and late contributors. To examine this facet of online contribution behavior, our study seeks to address the following research questions: why do people contribute early content at online contexts? Why do people contribute late content at online contexts?

LITERATURE

Research on contribution behavior at online contexts has examined facets of contribution behavior such as intention (e.g., Bock, Zmud and Kim, 2005), frequency (e.g., Fulk, Heino, Flanagin, Monge and Bar, 2004) and quality (e.g., Wasko and Faraj, 2005). The emphasis has been on explaining why an individual contributes content in response to a question (e.g., Constant et al., 1996) or why a person submits content that may benefit multiple readers without them asking this individual

for the content (e.g., Fulk et al., 2004). Though earlier work has highlighted the sense of community among contributors (e.g., Wasko and Faraj, 2005) and the importance of reciprocal benefits that could be obtained by an individual contributor (e.g., Thorn and Connolly, 1987), research on the interaction among independent contributors *with respect to a specific domain or topic* has been limited. While research has examined how communities evolve and are governed based on interactions among contributors (e.g., Orlikowski and Yates, 1994), studies explaining how the contribution behavior of an individual is affected by other contributors have been sparse. In particular, the influence of the existing contributions by others on a topic on the likelihood of an individual contributing on the same topic has not been examined to the best of our knowledge.

In order to explain individual contribution behavior, scholars have drawn upon multiple theoretical perspectives such as, for example, collective action (Fulk et al., 2004), theory of weak ties (Constant et al., 1996) and theory of reasoned action (Bock et al. 2005). Most of this line of work has drawn upon human motivations as the underlying basis for explaining why individuals contribute (Olivera, Goodman and Tan, 2008). For example, research has employed extrinsic and intrinsic motivations (e.g., Ko, Kirsch and King, 2005), compliance with norms (e.g., Bock et al., 2005) and reciprocity (e.g., Thorn and Connolly, 1987). However, motivations provide only a partial explanation for why an individual contributes (Olivera et al., 2008). Before a person is even motivated to contribute, he or she has to consider the contribution behavior as being one of several possible courses of action to be taken. Therefore, to supplement the approach used in prior research that frames an individual as being driven by personal and social motivational forces, we need theories that recognize the thinking or cognition in an individual's mind that enables him or her to decide on a specific act of contribution.

Research to date has drawn upon different theoretical frameworks of cognition. Where the focus is on the technology underlying a given online context, scholars have employed structuration theory (e.g., Orlikowski and Yates, 1994) or the theory of affordances (Zammuto, Griffith, Majchrzak, Dougherty and Faraj, 2007) to explain the interplay between individual cognition of the technology and the effect of such technology on the actions of individuals. A different approach focuses on the problem-solving involved in addressing a question at a Q&A forum (Olivera et al., 2008). While technology and problem-solving are important aspects of an online context, cognitive theories speaking to those aspects do not address how the individual contributor relates to other individuals with respect to a given domain or topic. We therefore need a framework that explains cognition about contribution as a social activity.

Contributing content at an online context involves behavior that benefits others, irrespective of whether it benefits oneself. Such activity can therefore be viewed as prosocial behavior or helping (Moon and Sproull, 2008). The bystander model of intervention is a framework that explains how an individual acts in situations needing help (Latane and Darley, 1970). It is a cognitive model of helping in the presence of others in a given situation. This model posits that individuals follow a decision process when faced with situations in which there are alternative avenues for helping or when there are other potential helpers. The process includes five components: noticing the event; interpreting it as requiring help; assuming responsibility for it; knowing an appropriate method of helping; and implementing the decision. When applied to emergency situations unfolding in an offline context, this model has been shown to explain individual helping behavior well. However, calls for content at an online context are seldom of a nature requiring immediate attention. Moreover, individuals often access a site at different times and therefore reach a given topic separately as compared to the offline context in which the cognitive model has been developed.

A MODEL OF EARLY CONTRIBUTION

We draw upon and extend the classical cognitive model of helping to develop our model of early contribution at online contexts and present hypotheses below. Of the five components of that model, we explain the effects of three: knowing an appropriate method of helping (using the construct of self-perceived competence), interpretation of the situation and assumption of responsibility (both using the construct of social adjustive motive toward general others). We extend the model by also employing the construct of social adjustive motive toward specific others.

Hypotheses

Individuals vary in the amount of expertise they possess with respect to a given domain at an online context. Consistent with the construct's meaning in prior research on online contexts (Constant et al., 1996; Wasko and Faraj, 2005), we define competence or expertise as the constellation of "characteristics, skills, and knowledge that distinguish experts from novices and less experienced people" (Ericsson, 2006). Research on contributions to online contexts has shown that competence positively influences the likelihood of contribution by an individual (Wasko and Faraj, 2000) and usefulness of contributions (Constant et al, 1996). In an online context, however, there may be a variable number of contributions on a given topic before an individual arrives at that section of the online context. People are not present together as the situation unfolds but arrive at

different times. The cognitive model of helping (Latane and Darley, 1970) predicts that a person's competence positively determines whether he or she will contribute in the presence of other potential contributors *who have not yet stepped forward to help*. Therefore, the individual is more likely to contribute when there is no existing contribution or when there are very few contributions as he or she believes one's competence can be applied fruitfully there. In extending the classical model's implications for situations in which there are *existing contributions by others*, we argue that a person with more self-perceived competence is likely to assess the existing content and contribute only if he or she feels that adequate help has not already been given (Clary and Orenstein, 1991). Where there are many existing contributions by others, the varying needs of potential readers are more likely to have been met as compared to when there are fewer contributions (Constant et al., 1996). Therefore, other things being equal, he or she will skip topics on which there are many existing contributions given the likelihood that they have already covered the ground. For a person with lower competence, on the other hand, the cognitive model of helping predicts that the individual would tend to contribute less as he or she does not judge oneself to possess the requisite ability or skill to provide assistance. When there is no or little existing content, therefore, such an individual would tend to step forward less than someone with greater expertise. In the presence of many existing contributions, on the other hand, the same person has a lower ability to judge whether those contributions meet the need of potential readers. Other things being equal, such a person is more likely to contribute even when there are existing contributions as compared to a more competent individual. Thus, overall, a person with higher competence will tend to contribute to topics on which there are fewer existing contributions as compared to someone with lesser expertise.

H1: The greater the self-perceived competence of an individual, the higher will be his or her propensity to contribute early content.

An important feature of online contexts such as product review sites is the presence of many potential contributors. According to the cognitive model of helping, there are two different mechanisms by which such presence affects an individual's likelihood of helping. In situations where the individual communicates with those other people, their social influence tends to direct the individual to do what they do. On the other hand, when there is no communication the individual would tend to not help since he or she considers them to be responsible for helping in the given situation leading to a diffusion of responsibility (Latane and Darley, 1970). We integrate these two mechanisms through the individual-level construct called the social adjustive motive (SAM). The social adjustive motive is defined as the drive to be with and become like others whom one considers as important (Clary, Snyder, Ridge, Copeland, Stukas, Haugen and Miene, 1998). Further, social adjustment can be of two types (Prentice, Miller and Lightdale, 1994). An individual may associate with a general group of others based on a social identity (Tajfel, 1982). Alternately, a person may be attached to specific other people, e.g., to a specific person in an online cancer support group (Ren, Kraut and Kiesler, 2007).

A person driven by the social adjustive motive toward others in general (SAMG) would like to associate with others irrespective of who they are. When he or she sees a topic on which many others have contributed content, the individual joins the group by submitting one's own content. Consistent with the social influence mechanism of the cognitive model of helping, such an individual is directed by social influence more toward topics where a larger group of people have contributed as compared to topics where fewer people have submitted content. This tendency will hold across topics each of which have many contributions irrespective of who those other contributors are and whether those other contributors are the same or different across topics. Thus he or she will tend to contribute late than early on a given topic. For an individual who has a lower level of the SAMG motive, in contrast, the social influence of other individuals would tend to be less salient. Given that he or she has a lower interest in associating with others in general, the presence of content by other contributors would indicate that others can and will provide help and thus dissuade him or her from adding one's own contribution, consistent with the diffusion of responsibility mechanism of the cognitive model of helping. Other things being equal, such a person will tend to contribute early rather than late. Overall, therefore, an individual with higher SAMG motive will tend to contribute content later as compared to someone with lower SAMG motive.

H2: The greater an individual's social adjustive motive toward others in general, the lower will be his or her propensity to contribute early content.

Unlike the SAMG motive, an individual with the drive to associate with specific individuals (SAMSA) strives to bond with those people independent of any affinity based on affiliation to a group whether big or small (Ren et al., 2007). Though not emphasized in the cognitive model of helping in an offline context, such bonding with specific individuals is relevant in an online context due to the ease with which a potential contributor can keep track of the activity of other contributors using mechanisms provided at a site, e.g., as part of online social networks. In contrast to focusing on a given topic and the other individuals who contributed on it, the perspective of a person who is driven by SAMSA is more on bonding with friends who may contribute on various topics. This person will contribute content to share his or her views in a dialog with this specific group of individuals, consistent with social learning (Bandura, 1977) rather than the social influence hypothesis that is part of

the classical cognitive model of helping. The selection of topics on which the person contributes will be driven more by the nature of topic with regard to its interest to the individuals with whom he or she identifies and less by the number of people who are contributing content on it. Some of the topics which he or she selects will have few or no contributions whereas other topics that he or she selects will have many other contributions. Thus, overall, the SAMSA motive will have no significant effect on whether a person is an early contributor on the topics chosen by him or her.

H3: An individual's social adjustive motive toward specific others will have no significant effect on his or her propensity to contribute early content.

We include two control variables, fit with daily routine and composition skill, as additional determinants of earliness of contribution.

METHODOLOGY

Data collection

We chose the site of product reviews at Amazon.com to test our model of earliness of contribution. We measured four independent variables of self-perceived competence, social adjustive motive toward others in general (SAMG), fit with daily routine, and self-perceived composition skill using seven-point survey items. We adapted items for SAMG from Clary et al. (1998) and developed items for the other three constructs. We ensured reliability and validity of the scales by following procedures prescribed by Moore and Benbasat (1991). We measured one independent variable, SAMSA and our dependent variable earliness of contribution (EARLYCNT) using data obtained from Amazon.com for those individuals who responded to our survey. To measure SAMSA, we counted the number of people whom a given individual had indicated as friends or interesting people on Amazon.com's social network. For EARLYCNT, we counted the number of reviews that existed before an individual contributed his or her own review. The higher the median number of existing reviews, the less early the individual was for that product.

We identified 47,428 reviewers as comprising the target population. We invited a random set of 3500 to take our online survey. The survey had a response rate of 10%, with 279 responses out of 2740 potential respondents to whom our survey invitation email was delivered (760 email were returned as undeliverable). The response rate matches the rate obtained for email or web-based surveys by researchers (Couper, 2000). Out of the 279 responses, 44 contained missing data that we deleted thus resulting in a set of 235 responses.

Analyses and results

To test our hypotheses, we used LISREL 8.80 to analyze the covariance matrix of the data based on the survey items and contribution archives. Table 1 provides details on the descriptive statistics. Table 2 has the correlation matrix. Figure 1 indicates the path coefficients and variance explained.

Construct	Mean (Std. deviation)	Cronbach alpha	Composite reliability	Average variance extracted
Self-perceived competence	5.591 (1.050)	0.743	0.764	0.523
Social adjustive motive toward others in general	3.895 (1.676)	0.941	0.942	0.843
Social adjustive motive toward specific others (log of the number of friends of the contributor)	0.515 (2.135)	N/A	N/A	N/A
Fit with daily routine	4.572 (1.513)	0.838	0.850	0.659
Self-perceived composition skill	5.549 (1.410)	0.822	0.822	0.698
Earliness of contribution (log of the median number of existing reviews per review)	2.060 (1.494)	N/A	N/A	N/A

Table 1. Descriptive statistics

We analyzed our model in a two-step procedure (Anderson and Gerbing, 1988). The test of the measurement model indicated the following acceptable fit indexes (Gefen, Straub and Boudreau, 2000): $\chi^2_{52} = 79.459$ (χ^2 to degrees of freedom ratio of

1.528), RMSEA = 0.0463, NFI = 0.942, CFI = 0.979, GFI = 0.951, AGFI = 0.915. The loadings of the items on their intended latent constructs were significant. The measurement model is also unidimensional as indicated by the standardized RMR value of 0.0370, which is below the threshold of 0.05 (Segars, 1997). The composite reliability of each latent construct is above 0.70 indicating convergent validity (Fornell and Larcker, 1981). The average variance extracted is above 0.50 indicating that each of the constructs capture more than half of the variance as compared to measurement error. Finally, we confirmed the discriminant validity of the measurement model by comparing the χ^2 of our six-factor model with the fifteen possible alternative five-factor models (Segars, 1997). Next, we analyzed both the measurement and structural model. LISREL converged in eight iterations and showed the following fit indexes: χ^2_{52} = 79.459 (with a ratio of degrees of freedom to χ^2 = 1.528), RMSEA = 0.0463, NFI = 0.942, CFI = 0.979, GFI = 0.951, AGFI = 0.915 and standardized RMR = 0.0370. Following MacCallum, Browne and Sugawara (1996), we estimated the power of our test for closeness of fit of our theoretical model to the data as 0.825, which is above the recommended value of 0.80.

	CMP	SAMG	SAMSA	TA	CS
Self-perceived competence					
Social adjustive motive toward others in general	.070				
Social adjustive motive toward specific others (log of the number of friends of the contributor)	-.037	.127			
Fit with daily routine	.206**	.160*	.024		
Self-perceived composition skill	.258**	.025	-.074	.274**	
Earliness of contribution (log of the median number of existing reviews per review)	-.195**	.112†	-.005	-.058	.049

Table 2. Correlations among model constructs

Notes: **CMP**: Self-perceived competence; **SAMG:** Social adjustive motive toward general others; **SAMSA**: Social adjustive motive toward specific others; **TA**: Fit with daily routine; **CS**: Self-perceived composition skill; **EARLYCNT:** Earliness of contribution. (** p < 0.01, * p < 0.05, † p < 0.10)

Our data shows sufficient evidence supporting our three hypotheses (Figure 1). The respective paths from self-competence and the social adjustive motive toward others in general to earliness of contribution have significant t-values and signs that are consistent with hypotheses H1 and H2 respectively. Thus, individuals with greater self-perceived competence tend to contribute earlier on a given topic as compared to those with lower self-perceived competence. On the other hand, those with a higher level of social adjustive motive toward general others tend to contribute later on a given topic as compared to those with lower level of social adjustive motive toward general others. The coefficient for the path from social adjustive motive toward specific others was not significant in line with hypothesis H3. The power value greater than 0.80 of our overall model for a test of close fit gives us adequate confidence that we would be able to detect a major specification error in any relationship (MacCallum et al., 1996) and in particular for the relationship in hypothesis H3. As an additional test of the hypothesized non-significant relationship, we compared the χ^2 value of a model in which the coefficient for the path between the latent construct of SAMSA and earliness of contribution was constrained to be zero with a model in which this path was free (Bagozzi and Yi, 1988). The change in χ^2 (0.111) relative to the change in degrees of freedom (1) was not significant. Further, the standardized expected parameter change (SEPC) was -0.021, a very low value. Thus, there is an adequate basis to conclude that relationship between SAMSA and earliness of contribution is not significant in the population (Kaplan, 1995). Contributors for whom the social adjustive motive toward specific others is salient are indifferent as to whether they contribute early or late on a given topic.

DISCUSSION

Our paper contributes to theory in two ways. First, it presents a cognitive model of contribution behavior at online contexts to supplement the theories of motivation that have been used in the literature in line with the call by Olivera et al. (2008). Second, our cognitive model addresses the social interaction among contributors at an online context and thus complements the cognitive models in IS research that address aspects such as the technology and the problem-solving activity.

The study points to the need for administrators to target people with different mechanisms to encourage contributions at different points in the sequence of contributions at a given topic. To have early contributions on a given topic, the site needs to invite those with expertise to contribute. This may be in the form of incentives to experts to be the first to contribute or

notifications about topics that either have no or little content. Further, such invitations and incentives would need to be based on a match between the individual's expertise and the potential topic that is available for contribution. Site managers can promote topics with many existing contributions to induce those with the social adjustive motive toward others in general to contribute. This will ensure that the rate of new contributions to such topics does not diminish. A balanced coverage of contributions across of topics could also be attained by providing ways for people to connect to specific others. Using notifications provided by a social network, for example, individuals with the social adjustive motive toward specific others will be able to follow others of interest to them and thereby contribute irrespective of the number of existing contributions.
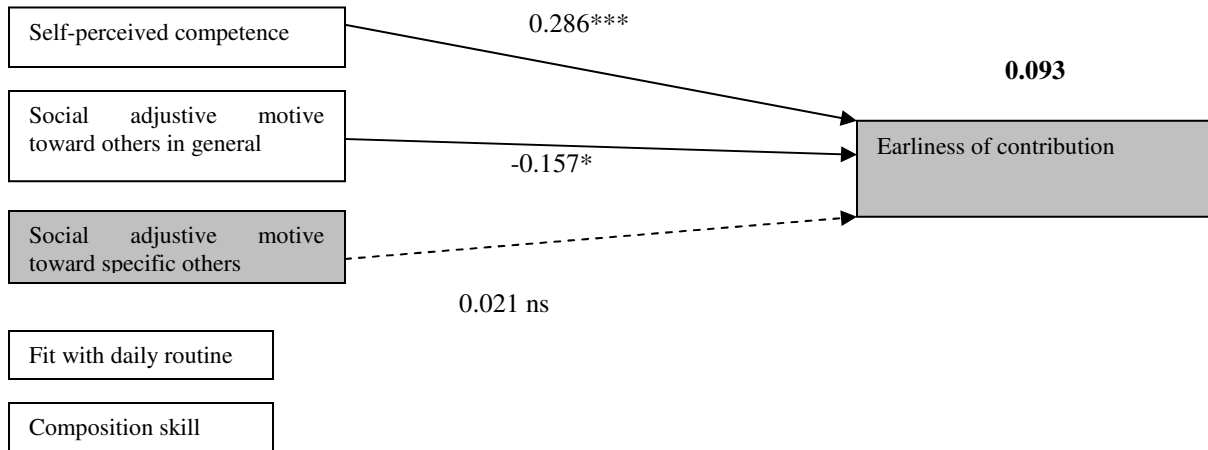

Figure 1. LISREL results of test of model of earliness of contribution

Boxes shaded in grey represent variables measured based on archival data. _____ Solid arrow indicates hypothesized significant relationship, - - - - - - Dashed arrow indicates hypothesized null relationship. No arrows indicated for the two control variables since they do not have formal hypotheses associated with them. Variance explained in **bold** *** Significant at $p < 0.001$, ** Significant at $p < 0.01$, * Significant at $p < 0.05$, ns not significant

The results of our study should be interpreted in the light of certain limitations. First, the study was conducted at a single site of product reviews. Further research at other types of online contexts is needed to confirm the generalizability of the findings. Second, as with other cross-sectional studies, the inference of causality needs to be verified by studies that test the hypotheses in a controlled setting of an experiment. Future research could also extend and test the cognitive model of helping to explain aspects of contributions other than earliness. Integration of cognitive models that consider more than one aspect of an online context such as technology, problem-solving and social interaction could be another avenue of research.

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