

ONLINE GAME DEVELOPERS' INFORMATION ADOPTION IN ONLINE GAME USER COMMUNITIES

Research-in-Progress

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Abstract

This study investigates how online game developers adopt information from online game user communities. We investigate the impact of the properties of threaded discussions in online game communities; the properties of posters, the properties of postings, and the properties of contents. Based on the Heuristic Systematic Model (HSM), we argue that the properties of posters and the properties of postings are both heuristic cues that influence the perceived credibility of sources. We also argue that the properties of contents are systematic cues that influence the perceived importance of information in threaded discussions. Further, the perceived source credibility and the perceived information importance will influence the intention to adopt information from threaded discussions by online game developers. Using objective and content analysis data from online game user communities, our hypotheses will be empirically tested. Results will be presented in the full paper.

Keywords: Online community, online game developer, intention to adopt information, heuristic systematic model (HSM), perceived source credibility, perceived information importance

Introduction

Currently, with the help of a growing number of computing devices (e.g., PCs, smartphones, tablet PCs, etc.) and a widespread Internet infrastructure, more people are participating in online communities (OCs) to share their opinions and information, express views, as well as ask/answer questions. Especially in the online game industry, OCs are very popular nowadays. For example, on MMROPG.com alone, more than 1.3 million members worldwide participate in approximately 450 online forums for each online game, which in turn, has generated more than 4 million discussion postings as of April 2011 (Gonzales 2009).

In the competitive environment of the online game industry, companies provide users with online discussion forums on their own Websites, which are mainly made for game users to look up FAQs (Frequently Asked Questions), ask questions, or make suggestions to them (e.g., <http://www.lineage.com/community/>). However, this *direct channel of users' voices* may offer only limited information about customers' needs, such as error-reporting, upgrade requests, or technical questions about the games. Therefore, in addition to their own online forums, game service providers look into OCs operated by third-party users (e.g., <http://www.facebook.com/Lineage?ref=sgm>). According to an interview with one of the developers of an anonymous online game provider, he is also a member of several OCs operated by game users and regularly lurks in the communities to monitor the quality of the online game services (that he is currently involved in developing) and gets ideas pertaining to the development of new services. In particular, right after a beta-version of an online game is released, what he normally does is to actively monitor the early adopters' responses in such 3rd-party online game user communities (OGUCs) to see if there is anything to be improved or further developed. In addition, when the company gets into the project of developing a new version of online game services, developers look into OGUCs so that they can incorporate customers' voices into their new service development. With this repetitive participation, visiting OGUCs often becomes a routinized chore for online game developers. Also, according to the anecdotal evidences (informal interviews with key informants in the online game industry), frequently mentioned word-of-mouth (WOM) information in OGUCs even affect the managerial decision of developing new game services or upgrading current game services, because it often represents the voices of customers who are using (or potentially using) the game services. As such, although third-party user-oriented OCs are mainly created for game users to share their opinions about games, the anecdotal evidence above shows that they can be valuable information sources for online game developers. For example, frequently discussed issues in OGUCs could be a good starting point for the development of their next version of the current game service. Further, the discussion of online game participants on comparisons among several competing games can be treated as important WOM information for the development of new games. Research also suggests that listening to the voices of customers and managing consumers' WOM constitute a critical process of product development and innovation (Czepiel 1974; Pitta and Franzak 1996).

This study drives our attention to *the value of WOM in OGUCs* for online game developers and investigates how they get the best out of OGUCs. Although OGUCs could be of importance, not every threaded discussion provides valuable information for them. Moreover, the time allowed for them to lurk in OGUCs to find acceptable information is usually limited (i.e., participating in OGUCs is not the main task for them). As such, they should selectively articulate and adopt information in threaded discussions in OGUCs. Thus, knowing what properties of threaded discussions in OGUCs will impact game developers' information adoption may enable them to benefit from OGUCs in a more efficient way. However, to the best of our knowledge, little effort has been made to identify the key properties of thread discussions in the OGUC context and investigate the differential impacts of such various types of properties on information adoption from *a developer's point-of-view*. In this study, we address these issues by trying to answer the following research question: *How do the properties of threaded discussions in OGUCs influence the way online game developers adopt information?*

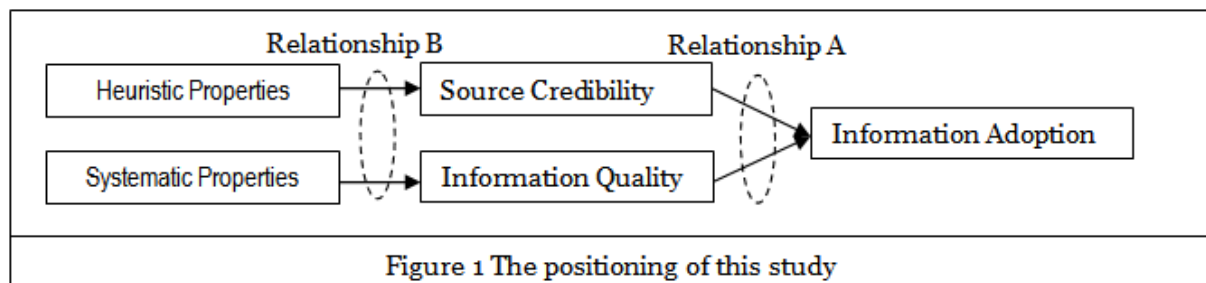
To answer this question, we first review the literature on the impact of the objective (observable) and subjective properties of threaded discussions to find the gap in the current literature and position this study in the stream of knowledge management (KM) research in the OC context. By not only investigating several sample threaded discussions, but also drawing upon the theoretical perspective of heuristic and systematic model (HSM) (Chaiken 1980), we identify and classify the properties of threaded discussions in OGUCs into three categories: (1) heuristic properties related to posters; (2) heuristic properties related to postings; and (3) systematic properties. Then, we propose a model of information adoption of online game developers by extending Zhang and Watts' (2008) Information Adoption Model. More specifically, we first argue that in the context of OGUCs, the heuristic

properties of a threaded discussion can be divided into *poster-related* and *posting-related* heuristic cues, and these two distinct types of cues differentially influence the perceived *source credibility* of threaded discussions, which in turn, leads to *information adoption* of online game developers. In addition, we identify two systematic cues especially critical for online game developers - *the degree of disconfirming* and *the degree of referencing* - and argue that both cues positively influence information adoption through perceived *importance (rather than quality) of information*. The proposed research model will be empirically investigated with both *objective* and *subjective rating data* gathered from the threaded discussions of a focal OGUC (i.e., Inven, one of the most popular OGUCs in South Korea, www.inven.co.kr). Finally, we discuss how the results of this study not only extend our theoretical understanding of the role of OGUCs, but also provide additional guidance to online game developers.

Theoretical Background

Literature Review on the Impact of Core and Peripheral Properties of Threaded Discussions in OCs

In order to position our study within the existing literature, we focus on two research topics in the OC context: (1) information adoption; and (2) objective (observable) properties of threaded discussions or online postings. So far, there are a handful of studies that have investigated the antecedents of information adoption in the context of OCs (e.g., Cheung, Lee, and Rabjohn 2008; Zhang and Watts 2008). Although such studies have contributed to the body of knowledge on information adoption issues in the OC context, they are limited in that they have only focused on finding the relationships between participants' *subjective perceptions* on discussions (or postings), such as information quality or source credibility, and information adoption. As such, we found that the current literature on information adoption in online environments lacks an understanding of the importance of “cues” (both *objective* and *subjective* properties of online discussions) that trigger perceptual beliefs (perceptual variables identified in the prior literature), which in turn, lead to information adoption. Therefore, as shown in Figure 1, we try to focus on “Relationship B,” which represents what properties of online discussions are important in explaining information adoption through perceptual variables, such as source credibility and information quality in the OC context, while the current literature has validated “Relationship A.”



On the other hand, a plethora of studies has investigated the impact of objective properties of online threaded discussions or postings. In the context of online product reviews (OPRs), they have focused on the impact of objective properties such as product ratings, ranking systems, or recommendation systems, on consumers' purchasing intentions or behavior (Chevalier and Mayzlin 2006), marketing (Chen and Xie 2005), price (Dellarocas 2003), sales (Dellarocas 2003; Forman et al. 2008; Zhu and Zhang 2010), and revenue (Liu 2006). Some other studies have looked into the relationships among other objective properties of online threaded discussions in OCs. For example, Mudambi and Schuff (2010) have investigated the impact of product star ratings and word counts on product helpfulness ratings. Although this stream of research investigates the objective features of online postings in various research contexts, their foci are limited to either end-users' behaviors or firm-related measures (e.g., sales, revenue, prices, etc.). Therefore, little effort has been made to investigate the impact of the objective properties of threaded discussions on individual information or knowledge adoption.

Taken together, the results of this study will bridge such a gap between two broad research topics: (1) information adoption; and (2) the role of objective measures within threaded discussions in the online environment. By investigating the impact of both objective and subjective properties of threaded discussions on game developers' information adoption, it will provide a better understanding of how online game developers adopt information from

threaded discussions in user-oriented OCs and how they emphasize the important role of WOM in the online game industry.

Information Adoption from OGUCs by Online Game Developers

According to the literature on knowledge-worker teams (Janz et al. 1997), online game developers are “knowledge workers” who should continuously acquire and adopt information from external sources of information (Gray and Meister 2004). That is, on top of programming and coding skills and abilities to write the storylines of online games into programming language, developers must also know what game service users want and address these desires by incorporating them into their game services. As mentioned above, anecdotal evidence found in our interviews shows that lurking in threaded discussions of OGUCs may result in valuable information for online game developers. However, like every other OC, not all threaded discussions in OCs are worthwhile for articulating or adopting information in them. Thus, online game developers should process information within each threaded discussion and should selectively adopt information for their tasks. In this study, we are looking at *information adoption* at the level of the threaded discussion in OGUCs, rated by online game developers, which is defined as the extent to which the content in a threaded discussion in the OGUC is adopted as meaningful after assessing its validity by online game developers (Zhang and Watts 2008). The following paragraphs will identify and explain which properties of threaded discussions in an OGUC are salient and important for explaining information adoption by online game developers.

Another important point of information adoption from OGUCs by the developers is that the way they see the information within threaded discussions will be different from that of game users. While users focus more on whether the information is valid and accurate, developers would focus on whether it is more important for their tasks (e.g., improving, updating, and reinventing focal online game services.) Thus, instead of focusing on information quality, we introduce *information importance* (Larcker and Lessig 1980) as one of the key perceptions that link the properties of threaded discussions and developers' information adoption.

Heuristic and Systematic Model (HSM)

HSM holds that the way individuals adopt information is influenced by dual modes of information processing: (1) *heuristic cues*; or (2) *systematic cues* (Chaiken 1980). This model provides a good framework to explain argument persuasion, information processing, and information adoption after the validation of contents (Zhang and Watts 2008). In this study, we focus on *information adoption* from posted threaded discussions in OGUCs, as previously mentioned.

If an individual gets involved in *heuristic* information processing, s/he adopts information based on heuristic cues (non-content cues), such as the identity of information sources, the credibility of sources, or the opinions of other audiences (Landy 1972; Miller, Maruyama, Beaver, and Valone 1976). Since heuristic processing does not require scrutinizing the actual content of a message, it can be more economical in terms of time and effort, while the conclusion could be misled by relying on peripheral cues that might not be related to the actual contents. On the other hand, when s/he becomes engaged in *systematic* information processing, s/he scrutinizes the content of a message itself rather than other peripheral issues (e.g., source credibility) by making an effort to comprehend and evaluate the message before adopting information from the content. Thus, when an individual employs systematic information processing, the properties of the message content plays an important role for information adoption (Zhang and Watts 2008). In the next section, we will describe what properties of a threaded discussion in OGUCs are either heuristic or systematic cues that have an impact on individual perceptions (e.g., source credibility and information importance) on the threaded discussion.

Threaded Discussions in OGUCs

OCs are defined as “open collectives of individuals with shared interests and attention to both individual and collective welfare” (Sproull and Arriaga 2007, pp. 1 ~ 2). OCs are now formed for many different purposes. In some OCs, members purely share information among one another (e.g., Tripadvisor, www.tripadvisor.com) (Zhang and

Watts 2008), while, in other OCs, members trade some personal goods (e.g., community-based online flea markets, www.gametz.com), engage in collaboration for knowledge creation (Lee and Cole 2003), or marketing (de Valck, van Bruggen, and Wierenga 2009). With the advent of new mobile devices and due to the broadband Internet infrastructure, there are various ways (technologies) to support the communication of users in OCs. However, still, text-based asynchronous communication technologies, such as e-mails and e-bulletin boards, are dominant technologies for sustaining the prosperity of OCs.

Despite the diversity of purposes, there are several common features in OCs (Lee, Lee, Bassellier, and Faraj 2010). First, the *entry barrier* of becoming a member of an OC is low since the boundaries of most OCs are more fluid than those of formal groups (Faraj, Jarvenpaa, and Majchrzak 2010). Because of this fluid boundary, not all members are active participants of the community (Kuk 2006); some members become more knowledgeable, experienced, and popular than others. In some communities such as the focal OGUC of this study (Inven, www.inven.co.kr), a certain member's level of participation, popularity, or experience is open to other members as an objective score. Second, a member's *social or hierarchical position* in an OC may have less influence on others' behavior or reactions. Rather, if shown, the level of a message poster's reputation, experience, and participation in an OC or actual content of a message may have a stronger impact on other members' reactions to the postings. Third, members are *weakly tied*. Since technically anyone in the world with computers and Internet connection can join OCs, the members tend to be geographically dispersed and come from different cultural backgrounds (Constant, Sproull, and Kiesler 1996). This would help information seekers from the OC obtain diverse information from different backgrounds. Fourth, members interact with one another under *generalized reciprocity* (Wasko, Teigland, and Faraj 2009). That is, one member's initiation can be reciprocated by many others. For example, if member A asks others about the use of a certain option in an online game, member B answers the question. This temporarily dyadic reaction can easily be generalized by other members, such as C, D, or many others who participate in the discussion. Such generalized reciprocity may cause members to feel that their participation and discussion with others are open to the general public. Thus, this generalized reciprocity may play an important role in ensuring the quality of information in threaded discussions, since repeated participation in a threaded discussion (by posting comments and answers as replies to others' participation) among members keeps validating the truthfulness of the discussion or yielding diverse opinions (Wathen and Burkell 2002). Finally, unlike face-to-face or phone conversations, discussions in OCs mainly happen in a *text-based asynchronous environment*. The message and comments are archived in OCs, so that they can be stored and retrieved later for others who are searching for specific information. Archived messages also come with the time posted, so that the message recipient can know how timely the information is in each threaded discussion. In sum, the contributors of information in OGUCs have different levels of participation, reputation, and expertise. These characteristics of participants are shown to other users in OGUCs as observable scores or points (see Figure 2). Information in an OGUC is diverse because of its boundary-less nature. Moreover, the information contents in an OC are archived into searchable text and can be validated by repeated participation of other members under generalized reciprocity. In this environment, by lurking in and scrutinizing users' threaded discussions in OGUCs, online game developers can find and adopt some important information, ideas, and insights for their further development of existing or new services. In the following section, we suggest properties that form heuristic and systematic cues, which will influence information adoption of online game developers through source credibility and information importance by investigating a focal OGUC (Inven).

Heuristic cues in a threaded discussion in OGUCs

As mentioned above, a heuristic cue of a message (a threaded discussion in this paper) refers to non-content information embedded in OCs. In the context of OGUCs, it is often possible to find many heuristic (non-content) properties in threaded discussions. As illustrated in Figure 2, it contains not only the *conventional properties of threaded discussions* (e.g., date posted, poster's identity, the number of visits, the number of recommendations, number of comments, and the actual length of the discussion thread, etc.), but also the *properties about the posters' level of participation, experience, and reputation*. In this study, we classified these heuristic cues into two categories: (1) poster-related heuristic cues; and (2) posting-related heuristic cues. Poster-related heuristic cues include the properties of the members who posted threaded discussions. In the context of our focal OGUC (Inven), each thread contains the poster's information in terms of his/her *reputation, experience in online games, and the level of participation* (see the solid ovals in Figure 2). Also, there are posting-related heuristic cues, such as *the number of views, the number of recommendations, and the number of comments* (see the dotted ovals in Figure 2). We argue that these two types of observable heuristic cues of a threaded discussion will influence the credibility of the threaded discussion.

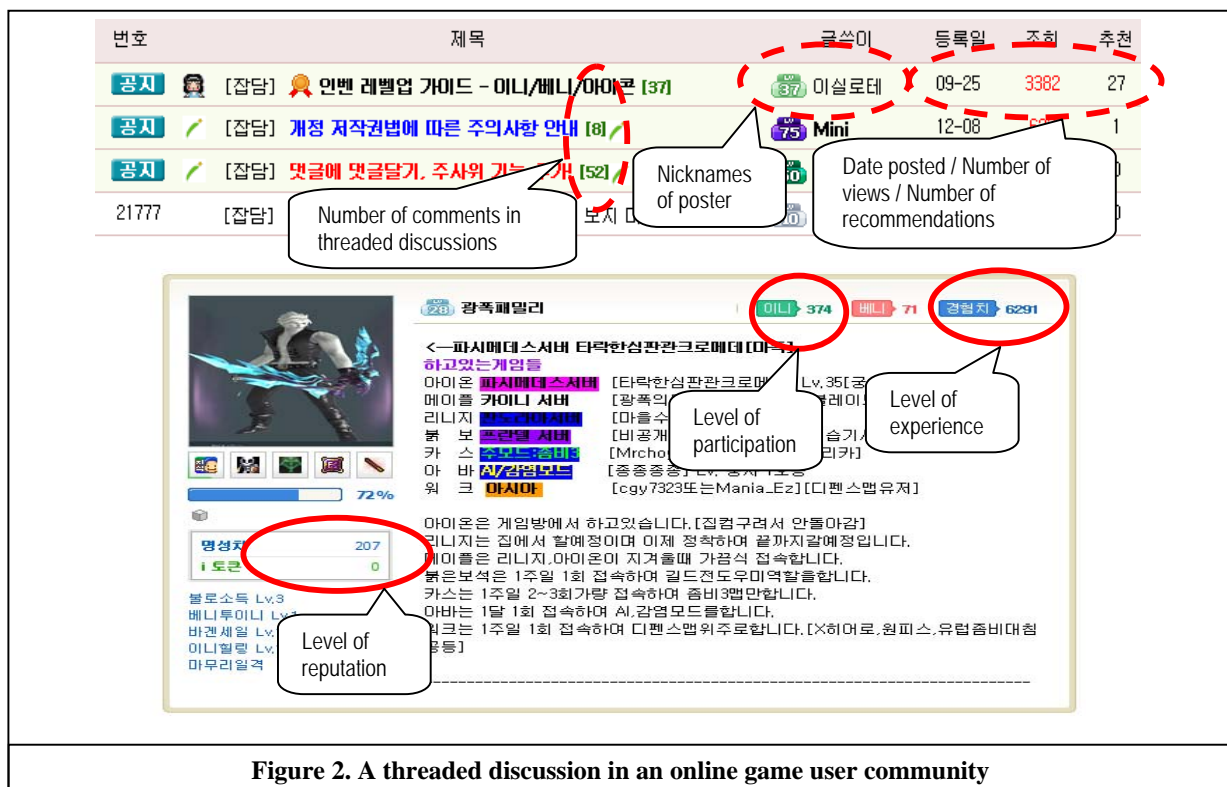


Figure 2. A threaded discussion in an online game user community

Systematic cues in a threaded discussion in OGUCs

An OGUC is the place where community members freely discuss any topics related to online games of interest to them. Thus, the main participants of our focal OGUC (Inven) are online game users who are customers of the online game services. The discussion among them in OGUCs could be a kind of WOM information for online game developers. By reading the discussions, they can learn how their customers think about the game services, how their game services are compared with other competing games, which areas of the game services they can improve, and even what kinds of new game services they should plan, etc. Instead of actively participating in the community, online game developers tend to lurk in the threaded discussions in which their customers are participating. In other words, OGUCs are external information sources (outside of their organizational boundary) for focal game developers. Thus, the way game developers see the information in threaded discussions within OGUCs could be different from the way the users do. As mentioned above, the perceived quality of information (i.e., the extent to which it is accurate, definite, and informative) (Zhang and Watts 2008) may not be a strong concern for developers when they adopt information from OGUCs. Rather, they will be more concerned about the salience or importance of the information within threaded discussions generated by game users. For example, a discussion about the detailed features of a game might be considered as "useful" or "high-quality" for online game users, while it may not be as useful for game developers because this kind of information is already what they know; the developers actually made that information to release. Rather, online game users' complaints, reported errors, unexpected ways of playing games, or other unforeseen results of the online game will be considered as more important and likely to trigger information adoption by online game developers. Thus, we suggest that *the perceived importance of information* can be defined as the extent to which online game developers perceive the information within threaded discussions to be relevant, informative, important, helpful, or significant. Perceived importance (Larcker and Lessig 1980) is one of the key perceptual concepts used to better explain information adoption for online game developers in OGUCs.

For the systematic cues in HSM (Zhang and Watts 2008), there can be other types of properties that will trigger systematic information processing of online game developers in the context of OGUCs. By investigating quite a few threaded discussion postings with the perspective of online game developers and by reviewing the extant studies on the properties of the contents in OCs (e.g., Kudaravalli and Faraj 2008; Zhang and Watts 2008), we have identified two properties of the contents of threaded discussions in OGUCs, which are perceived by online game developers as message recipients: (1) *the degree of disconfirmation*; and (2) *the degree of referencing*, which will eventually influence information adoption through the perceived importance of information.

First, *the degree of disconfirmation* refers to the extent to which a threaded discussion describes the situation that is inconsistent with the information and the features of online game services held by game developers. Thus, it can be high when online game developers find that the contents of threaded discussions in OGUCs contradict (1) the information of a game that is released with service (or posted on the online game Website); (2) knowledge of the game developer about the online game service; or (3) the way in which the online game service is supposed to work. A couple of previous studies have considered disconfirmation as a “motivating force” for systematic processing (by increasing issue involvement of readers) rather than one of systematic cues (Chaiken 1980; Zhang and Watts 2008). However, in the case of online game developers who read threaded discussions written by online game consumers, disconfirming information should be an important message on which they should probably base certain decisions in order to improve their online game services. They should scrutinize the message within threaded discussions first to find out if the discussion has any disconfirming information. Once they find some disconfirming information, they may make decisions about whether or not to take the information into consideration for game development. Therefore, from the viewpoint of online game developers, we will consider it as one of the most important systematic cues. Second, *the degree of referencing* is defined as the extent to which the information in threaded discussions refers to related objects, such as competitors' online game services, other games in the focal game developers' company, the computer systems on which the online game users play, related products, etc. For example, if the members of OGUCs discuss which game is better, they often refer to other companies' game services. If they talk about the errors in a certain part of an online game within a certain operating or hardware system, they frequently mention the specifications of their systems. This information, regardless of whether game users consider it important or useful, can be a critical source for online game developers. We will argue that this referencing information in threaded discussions in the OGUC context should be the other important systematic cue with which online game developers process information in threaded discussions.

Research Model and Hypotheses

The Impact of Poster-related Heuristic Cues

Although heuristic cues related to the poster of threaded discussions depend on different OCs (e.g., in Tripadvisor.com, the participant's name, the level of participation, and the number of helpful reviews are provided), in the focal OGUC of this study, as identified above, three prominent poster-related heuristic cues are available: (1) level of the poster's reputation; (2) level of the poster's experience; and (3) level of the poster's participation. These heuristic cues influence the way online game developers perceive the credibility of the participants of a threaded discussion. First, the participants' level of reputation is derived from other members' recommendations and replies to the postings of focal participating members. According to the extant literature, reputation is tightly related to source credibility (Herbig and Milewicz 1995). In the context of OGUCs, a high reputation score of the participants in a threaded discussion is positively related to high source credibility, since the contribution of the participants of threaded discussions with a high reputation score is more likely to be truthful. Second, the level of experience in online games of the participants in a threaded discussion may imply that they have good expertise in online games. Thus, the online game developer tends to believe that a threaded discussion with highly experienced participants will be a credible source of information (Eastin 2001). Third, the level of participation in OGUCs indicates the extent to which the participants of a threaded discussion have read and participated in discussion activities. Thus, the information user (game developer) tends to believe that the topics discussed in the threaded discussion come from a group of participants who know the history of other members' interactions, so that the online game developer will believe that threaded discussion as a more credible information source.

H1a ~ H1c: *Poster-related heuristic cues (a. level of reputation, b. level of experience, and c. level of participation in OGUCs) are positively associated with the perceived source credibility of a threaded discussion by online game developers.*

The Impact of Posting-related Heuristic Cues

In the context of threaded discussions in OGUCs, the discussion is sustained by the participation of many anonymous members, and they somehow validate the truthfulness and usefulness of information in each threaded discussion by *simply visiting them, marking them as “recommended”* (Mudambi and Schuff 2010), or *adding comments that sustain dialogues* (Kudaravalli and Faraj 2008), which in turn, generates three critical heuristic cues in our study (*the number of views, the number of recommendations, and the number of comments*). We argue that such heuristic cues are distinct from those of the participants of the discussion because we cannot guarantee that more experienced or reputable participants with a high level of participation will always initiate a threaded discussion that is more credible to other users. The fact that other participants have visited more often (a higher number of views), added more comments (a higher number of comments), and recommended (a higher number of recommendations) more often ensures that a focal posted discussion has been more populated, more diverse in terms of issues, and adopted by other online game users. Such indications of message popularity and information diversity will make online game developers believe that the information in the particular discussion should be credible.

H2a ~ H2c: *Posting-related heuristic cues (a. the number of views; b. the number of comments; and c. the number of recommendations) are positively associated with the perceived source credibility of a threaded discussion by online game developers.*

The Impact of Systematic Cues

Systematic cues in OGUCs are the information processing cues that come after an online game developer scrutinizes the information in threaded discussions in user-generated online game communities. First, disconfirmation happens when the information in a threaded discussion contradicts the information that the reader already knows. If the message recipient is a normal online game user, the extent to which s/he investigates the content and tries to adopt information depends on whether or not the quality of information in the threaded discussion is high, which is the case where disconfirming information triggers the judgment of information quality (in this case, disconfirming information is rather the trigger for the systematic processing than the systematic cue itself) (Zhang and Watts 2008). However, from the viewpoint of online game developers, who are involved in planning, making, and improving online game services, disconfirming information from users in online discussions is likely to be important information with which they can improve their products or services. With the perspective of online game developers, they may think that disconfirmation in threaded discussions come from (1) something that they never thought of; (2) users’ misunderstanding (originating from miscommunication) of game rules or system specifications; and (3) some errors that are not identified during the beta-testing period. Thus, a high degree of disconfirmation in a threaded discussion may be more relevant, helpful, or significant for their tasks of error correcting, software updating, and new product developing tasks. Thus, disconfirmation should act as an antecedent of the importance of information, since the relevance, helpfulness, and significance are key components of the importance of information (Larcker and Lessig 1980). In sum, the more disconfirming the information in the threaded discussion, the more the developer perceives that the information is important for his/her work.

H3a: *The degree of disconfirmation is positively associated with the perceived importance of information in a threaded discussion by online game developers.*

Second, referencing is high when a threaded discussion contains other related issues with the focal games, such as competitors’ game services, computing systems where a user plays the game, and other information related to the focal game. Online game users often share ideas about the comparison between different game services and the marketplace where they can buy, trade, and share game items, and so on. This kind of information can be important information for online game developers since it is not only informative for them, but it is also helpful and important as the information originates from WOM via their service users. Research also suggests that, as a developer, information about competitors, the external environment, and market orientation is useful and important information (Kohli and Jaworski 1990). This type of information is a useful systematic cue that will influence the perceived importance of information in the threaded discussion.

H3b: *The degree of referencing is positively associated with the perceived importance of information in a threaded discussion by online game developers.*

There seems to be a relationship between the two mediating variables; perceived source credibility and perceived information importance. For example, online game developers may not consider the information in a threaded discussion important unless the source is credible enough, which is a plausible argument. However, we will not put this argument into our study, as we pay more attentions on the mediating roles of them by verifying the existence of clear routes from the heuristic/systematic cues to online game developers' intention to adopt information through these mediating variables.

The Impact of Individual Perception of Developers on Information Adoption

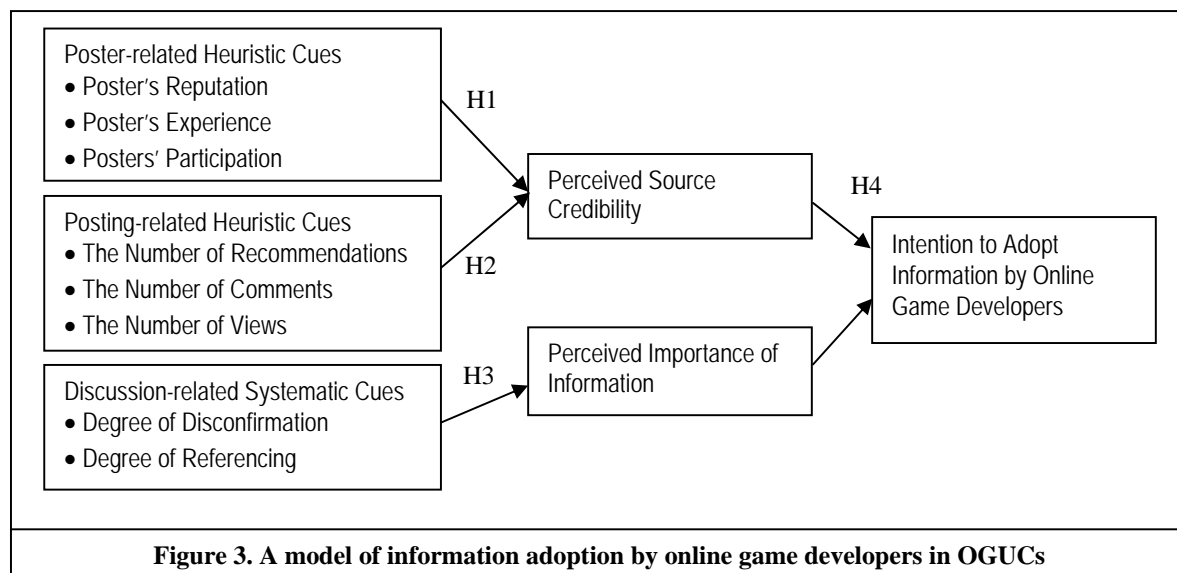
As investigated in Zhang and Watts' (2008) study, the perceived credibility of the threaded discussion is positively associated with information adoption of information recipients. We argue that this relationship should hold true for online game developers in OGUCs. With high perceived credibility (formed by both *poster-related participation, reputation, and experience scores* and *posting-related recommendations, comments, and view counts*) of a threaded discussion, the developers may easily recognize that the information within the threaded discussion is initiated by credible and active participants, as well as it is validated by their repetitive participation; they then may likely adopt it as meaningful. Therefore, we hypothesize that:

H4a: *The perceived source credibility of a threaded discussion is positively associated with the intention to adopt information from a threaded discussion by online game developers.*

Finally as previously mentioned, online game developers should adopt information from OGUCs, not merely because information in a threaded discussion is of high quality (accurate or definitive), but because the information is of importance for their tasks. If they perceive that information is relevant, important, informative, and helpful for their tasks, they will easily adopt it as meaningful. Therefore, we posit that:

H4b: *The perceived importance of information in a threaded discussion is positively associated with the intention to adopt information from a threaded discussion by online game developers.*

Figure 3 illustrates the model of information adoption by online game developers in OGUCs.



Methodology

The methodology is under development and needs further refinement. Although it will be available in the full version of the paper, here is a brief plan of our methodology.

Table 1. Definitions and raters of constructs				
Construct		Operational Definition	Rater	Reference
Intention to Adopt Information		The extent to which the content in a threaded discussion is adopted as meaningful after assessing the validity by online game developers.	Developers	Zhang & Watts (2008)
Perceived Source Credibility		The extent to which online game developers perceive the credibility of a threaded discussion.	Developers	Sussman and Siegal (2003)
Perceived Information Importance		The extent to which online game developers perceive that the information within a threaded discussion is relevant, informative, important, helpful, or significant.	Developers	Larcker and Lessig (1980)
Poster-related Heuristic Cues	Reputation	The extent to which the initial poster of a threaded discussion earns a reputation from other participants in OGUCs.	N/A (Observed data)	Self-developed
	Experience	The extent to which the initial poster of a threaded discussion accumulates experience through various activities in OGUCs (e.g., shopping, training, etc.).	N/A (Observed)	Self-developed
	Participation	The extent to which the initial poster of a threaded discussion participates in OGUCs.	N/A (Observed)	Self-developed
Posting-related Heuristic Cues	# of Recommendations	Number of recommendations in response to the initial posting of a threaded discussion.	N/A (Observed)	Self-developed
	# of Comments	Number of comments in response to the initial posting of a threaded discussion.	N/A (Observed)	Self-developed
	# of Views	Number of views in response to the initial posting of a threaded discussion.	N/A (Observed)	Self-developed
Discussion-related Systematic Cues	Degree of Disconfirmation	The extent to which a threaded discussion describes the situation that is inconsistent with either previously released game information or information/features held by developers.	Developers	Zhang & Watts (2008)
	Degree of Referencing	The extent to which the content in a threaded discussion refers to other games of the focal company, competitors' games, or other related sources.	Authors	Self-developed

Data

As the level of analysis in the study is the threaded discussion, data will be collected from threaded discussions of a free discussion board regarding the selected game service (e.g., Lineage 2, WoW) operated by Inven, which is one

of the most popular 3rd-party OGUCs in South Korea.¹ In order to consider OCs in their natural state, the target game service will be selected among others in which members' participation is currently active and stable (Rice and Love 1987). Then, threads during the recent six-month period will be collected to validate our research model. After reading each thread carefully, we will remove some "irrelevant" threads (e.g., threads without response, threads not related to the main topic, etc.). Through this filtering process, we will identify more than 300 threaded discussion samples for the final analysis.

Measures

We will test our research model using either the rating results of online game developers/authors or the observed objective data in the part of message headers of each threaded discussion. Dependent variable (information adoption), mediating variables (source credibility and information importance), and degree of disconfirmation will be measured by hiring and having several online game developers rate all sampled threaded discussions, based on rating schemes adapted from previously validated scales that fit within the OGUC context. The raters will be rewarded with a gift certificate upon completion of the rating task. We also developed a binary rating scheme on the degree of referencing in systematic cues since we were not able to identify suitable existing scales. Two authors will conduct a rating individually, and disagreements will be reconciled through discussions. Further, we will use the objective data collected from the target threaded discussions for both poster- and posting-related heuristic cues (reputation, experience, and participation for poster-related and # of recommendations, # of comments, and # of views for posting-related heuristic cues, respectively). Table 1 provides definitions of the constructs, raters, and key related references.

In order to avoid common method bias, information adoption (dependent variable) will be rated first, and the independent variables will be rated after 4 weeks by the same group of developers. The inter-rater reliability will be checked and addressed. Finally, a data analysis will be conducted by applying the structural equation model (SEM).

Conclusion

The results from this study are expected to contribute significantly to the literature on information adoption in OCs. First, focusing on online game developers' information adoption, instead of that of online game users, in user-oriented OCs, makes our research different from prior studies. Although an OGUC is not created for online game developers, it can be a valuable source of information for them. Second, while the previous studies have investigated only the impact of perceived credibility of source and quality of information on information adoption, we take one step further to identify the antecedent variables for these relationships by drawing upon HSM; we derive not only subjective systematic cues, but also objective heuristic cues that influence information adoption through individuals' perceptions on the information source (source credibility and information importance). By introducing the "importance of information" rather than the "quality of information," we differentiate the process of information adoption by the external participants of a focal OC (online game developers are external participants of an OGUC) from that of internal participants of the OC. As hypothesized, online game developers will consider the importance or salience of information in OGUCs than the quality of information. Third, we also extend the body of knowledge on HSM by doing research in the context of an online game industry.

This study has various managerial implications, as well. As we investigated information adoption from the developers' point-of-view, the results should shed light on how online Word-of-Mouth affect new product/service development and innovation in the online game context. More specifically, we might better understand what types/kinds of OGUC properties are influential, and how such heuristic or systematic cues are related to online game developers' information adoption. With the results from this study, online game developers may know which properties they should focus on when they visit and try to get valuable information from OGUC. We expect that we can provide more important and specific insights based on the results of our data analysis.

¹ As of May 2011, Inven was ranked first in terms of page views and number of members in South Korea (<http://www.rankey.com>).

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