2009

Understanding Herd Behavior in Technology Adoption and Continued Use: A Longitudinal Perspective

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(Research in Progress)

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ABSTRACT

People often discount their own information and imitate others though a process known as herd behavior. This paper investigates herd behaviors in technology adoption and continued use. Specifically, this paper concerns how people may follow others when choosing to adopt information systems and how they may revise this initial decision at the post-adoption stage. Herd literature suggests that people may discount their own beliefs when making adoption decisions and that these adoption decisions are fragile and can be easily reversed at the post-adoption stage. This has implications for existing information systems (IS) research on initial adoption and postadoption system use. We develop a new concept called ***level of herding*** to measure to what degree a person follows the actions of others, rather than his/her own beliefs, when adopting a new technology. A research model is developed. A longitudinal survey is being conducted to examine the research model, using PBwiki, an online wiki system, as the research technology. Findings from this research can help us understand herd behavior in the adoption and continued use of technology.

Keywords

Herd behavior, cognition update, technology adoption and continued use, wiki, longitudinal study.

INTRODUCTION

We have in recent years witnessed that a great deal of new technologies — from Amazon's Kindle, the iPod, the iPhone, to various types of Web 2 technologies — appear to have adoption patterns similar to those of new fashion trends. People often rapidly cluster on specific technologies: for example, it took only about ten months for Facebook to attract one million active users after its initial launch in February 2004, and by mid-2009, only five years later, this number had grown to 250 million[1]. Similarly, an article recently published by BBC News Magazinepresented an interesting phenomenon observed in Second Life that as "quickly as it [Second Life] had flared, media interest ebbed away".[2] There are many factors that may account for why people converge so quickly onto the same technology. One factor may be that people follow the decisions of others to various degrees. Such following behavior is known as *herd behavior* (Banerjee 1992; Bikhchandani et al. 1992). When people herd in adopting a technology, they discount their own information and base their adoption decisions strongly on the actions of other people. Below are two illustrative scenarios about herd behavior in technology adoption.

> Scenario 1: *"I began using Facebook, even though I'd never tried it before, simply because a lot of people were using it."*
>
> Scenario 2: *"I chose Skype among all the available communication tools, simply because it has been widely adopted by others. But now, having tried it myself, I don't think it is as good as I'd expected."*

Herd behavior, as illustrated in the above two scenarios, have been under-investigated in prior IS research. Some IS research (e.g., Duan et al. 2009; Walden et al. 2007) has offered evidence for the existence of herd behavior in technology adoption. For instance, Duan and colleagues (2009) observed dramatic jumps and drops of product rankings in e-commerce, indicating that people tend to choose the same products and also are likely to change their initial choices *en masse*. However, we should

[1] http://www.facebook.com/press/info.php?factsheet#/press/info.php?timeline

[2] Lauren Hansen, "What Happened to Second Life?" November 2009, BBC News Magazine. http://news.bbc.co.uk/2/hi/uk_news/magazine/8367957.stm

be aware that though people make the same decision, this does not necessarily mean they are herding. Sometimes, such clustering behavior may be the result of commonly shared information (Bernhardt et al. 2009; Bikhchandani et al. 2000; Cipriani et al. 2005; Grinblatt et al. 1995). Thus, there is a need to distinguish herd behavior from other types of clustering behaviors. This paper attempts to explicitly conceptualize and measure herd behavior in technology adoption and continued use.

Studying herd behavior in technology adoption and continued use is important. First, existing research models of user technology acceptance do not explain herd behaviors very effectively. Much of the research on user technology acceptance has more or less assumed that there are strong relationships between user beliefs about an IS and their adoption of this IS with an intention to use it. For example, the well-known Technology Acceptance Model (TAM, Davis 1989; Davis et al. 1989) posits that a users' intention to use an IS is largely determined by two user beliefs about the IS; usefulness and ease of use. Other factors, conceptualized as "external factors" in TAM, influence users' intention to use indirectly via these two user beliefs. In other words, external factors have to be internalized into one's belief system in order for them to affect his/her intention to use an IS. Many consequent studies have continued this assumption of the strong impact of user beliefs being the primary factor of one's intention to use. Without devaluating the importance of user beliefs, we argue, based on herd literature, that when people herd, they tend to discount their own information (i.e., beliefs) about an IS. In some cases, such as during an information cascade (Bikhchandani et al. 1992), people can completely bypass their beliefs and do whatever others do. This has implications for studying how people make adoption decisions, since they may make decisions by disregarding their own beliefs. Second, research on herd behavior in economics and finance suggests that when people make a decision by herding, their initial decision can be easily reversed later when new information is available. This is referred to as *the fragility of herding* (Banerjee 1992; Bikhchandani et al. 1992; Bikhchandani et al. 2000; Lieberman et al. 2006). This adds to our understanding of post-adoption system use, which is considered a promising new course of action of IS research (Benbasat et al. 2007).

We posit in this paper that people consider both their own beliefs about an IS and the actions and choices of others when making an adoption decision. The latter is captured by a new concept we call the **level of herding**, which is defined as *the degree to which one follows the actions of others when adopting a technology*. This paper investigates systematically how people follow others, to varying degrees, when making adoption decisions and how they may revise their initial decisions at the post-adoption stage. Specifically, this paper attempts to explore two research questions:

1. How do people make decisions about adopting an IS based on their own information and on the actions of others?
2. When a user adopts an IS by herding, how does he/she revise his/her initial adoption decision at the post-adoption stage? Or in other words, how does the level of herding at the adoption stage influence user behaviors at the post-adoption stage?

To address our research questions and thereby to better understand herd behavior in technology adoption and continued use, we developed a new research model. This research model is essentially an extension of Bhattacherjee and Premkumar's Cognition Change Model (CCM) (2004) that incorporates the level of herding. Bhattacherjee and Premkumar's CCM specifies the relationships between user beliefs, satisfaction, disconfirmation, and behavioral intention at both the adoption and post-adoption stages. As such, it is an ideal platform for addressing the research questions of this paper on adoption and belief updating. By integrating level of herding, the original CCM model is tailored to examine the herding behavior in technology adoption and continued use.

THEORETICAL DEVELOPMENT

Herd Behavior

When people are free to do as they please, they usually imitate each other.

— Eric Hoffer (1902-1983), writer/philosopher

We have witnessed and participated in innumerable situations where our decision making is influenced strongly by what others around us are doing. Often, people discount their own information and instead imitate others when making decisions. Such behavior is known as *herd behavior*, which refers to the phenomenon that "everyone does what everyone else is doing, even when their private information suggests doing something quite different" (Banerjee 1992 p.798). Herd behavior has been observed in various situations such as choosing retirement investments (Choi et al. 2003), opening new bank branches (Chang et al. 1997), developing prime time television programs (Kennedy 2002), and in downloading software applications (Walden et al. 2007), to name a few notable examples. It has been argued that "everyone herds somewhat, and most people herd a lot" (Prechter 1999 p. 174). Now, let us use a scenario to illustrate the key points of herd behavior.

[Scenario 3:] *Imagine two technologies, Alpha and Beta, which have similar functionalities and qualities. People need to choose one of them. The first person, Alex, prefers Alpha and thus chooses it. The second person, Barbara, thinks that Beta is slightly better, based on her limited information about these two technologies. She does not really know much about these two technologies though. Therefore, she follows Alex's choice, believing, rightly or wrongly, that Alex knows better about the qualities of these two technologies than she does. Observing that both Alex and Barbara have chosen Alpha, a third person, Carol, is likely to choose it as well. As more people join this herd, it may be in a follower's best interest to disregard his/her own information and simply follow others. A herd is formed: the people all choose Alpha, although not all of them prefer it to Beta.*

As we can see from the above scenario of choosing a restaurant, herd behavior has two aspects: *imitating others* and *discounting one's own information*. First, herd behavior means one imitates others in making a decision. Second, imitating others is often accompanied by discounting one's private information. For instance, observing a long queue in front of restaurant, one may imitate others in the queue and join the queue, and give up on his or her own preferences (e.g., another restaurant).

As illustrated in the above scenario, herd behavior has two aspects: *imitating others* and *discounting one's private information*. The first is that herd behavior, by definition, means that a person who is herding imitates others when making a decision. The second is that imitation of others is often accompanied by the person discounting his/her own private information. For example, when observing a long line in front of restaurant, one may imitate the people in the line and join them there, ignoring his or her own preferences (e.g., another restaurant) in favor of one that appears to be liked by a large number of other people.

Herd behavior is characterized by low informativeness. In herd behavior, people pass on their precedors' signals to their followers, without adding new information. Let us examine Scenario 3 again to study the informational aspect of a herd. As we can see from this scenario, the first person, Alex, sends the signal of his own preferences (e.g., Alpha is better than Beta) to his later followers by choosing Alpha. The second person, Barbara, discounts her own preference (Beta) and instead follows Alex's choice. In this sense, this herd does not faithfully reflect Barbara's preferences and thus has low informativeness to its followers. The third person, Carol, may mistakenly believe that both Alex and Barbara prefer Alpha. This observation causes her join the herd and discount her own preferences as well, thus further decreasing the informativeness of the herd. As a result, a herd usually does not carry as much information as might be expected: just because many people use a technology does not necessarily mean that every adopter prefers it. In an extreme case, only the first person might actually like the technology and all the others are just following him/her.

Fragility of Herding

A key implication of the low informativeness of herd is that the equilibrium of a herd may be volatile (Banerjee 1992; Bikhchandani et al. 1992; Bikhchandani et al. 2000; Lieberman et al. 2006). By imitating others and discounting their own information, people may converge on the wrong decision (Bikhchandani et al. 1998) leading them to adopt inferior technology (Abrahamson 1991). By simply following other peoples' decisions, a person may overlook his or her own needs and thus may mistakenly choose the technology that is inefficient for his or her work. Sometimes, people will even follow the herd and make decisions that they know are wrong. As vividly put by Prechter (1999), *"when panic ensues, those less prone to panic know that if they do not act, they may be driven bankrupt by those who do. This knowledge creates a chain reaction as otherwise calm people succumb to the fear that the panic will ruin them"* (page 174-175). Therefore, whenever later have a chance to address this decision, a person may seek to correct this mistake, initiating the collapse of the herd.

An immediate consequence of the fragility of a herd is that the herd may switch *en masse*. Every person in a herd knows that he/she is making the decision based on very limited information. A new piece of information may easily change his/her mind and, as a result, the whole herd seems "flighty": rapidly achieving conformity and then later having people switch away from the herd. Such a switch runs the risk of collapsing the status quo of the herd. A prominent example is the collapse of the Internet bubble in the middle of 2000: some pessimistic assessments of the then-blooming Internet bubble began to appear and then grew rapidly (Lieberman et al. 2006) causing the premature collapse of the speculative Internet market. In another example, Choi's work on how employees chose retirement plans also suggested that the complexity of choosing a retirement plan makes people seek to follow others by choosing the default plan (Choi et al. 2003). Once the default plan is changed, people simply herd when switching to the new default plan.

Level of Herding in Technology Adoption

As discussed earlier, a common place to find people exhibiting herd behavior is in the adoption of new technologies. For example, the observation that people waited in line to purchase the first-released iPhone in the summer of 2007 might have stimulated other people to follow and purchase an iPhone themselves. People often consider the existing adoption status of an IS when adopting it: I adopt an IS ―despite having no actual experience using it― because it has been adopted by a lot of other people. Consistent with prior herd literature (Banerjee 1992; Bikhchandani et al. 1992), we define in this research **herding in technology adoption** as *the phenomenon that a person follows others when adopting a technology.*

People make decisions based on both their own private information and observations of the actions of others. The phenomenon in Scenario 3 ―that all people end up at the same choice― seems unrealistic. This is because not everyone completely disregards his/her private information and imitates others. Most of the time, people depend on their own information as well as their observations of others' behavior, rather than just one or the other. For instance, Avery and Zemsky (1998) argued that in financial markets, agents trade on the difference between their own information and the public available information.

This sort of situation, where people consider both the actions of others and their own private information is, compared to our earlier scenario where all people converged on the same decision, more realistic. Consider that both Facebook and LinkedIn, two technologies which are similar in both function and features, are flourishing at the same time. People may still herd, to varying degrees, in adopting one or the other of these two social networking technologies. However, in the competing market, mixed signals from predecessors may make herding less common, while the effects of herding are somewhat offset by private information. In other words, facing mixed signals from predecessors, people are more likely to take into account their own information when making a decision (Banerjee 1992). Prior studies on herd behavior (e.g., Allsopp et al. 2000; Anderson et al. 1997; Hey et al. 2004 p.639; Kubler et al. 2004), also found that herd behavior is "observed but is somewhat less widespread than is predicted by the respective theories, with agents following their own signals more than the theory predicts" (Hey et al. 2004 p.639). They further pointed out that people do not follow a strict Bayes' rule, i.e., basing their decisions on the calculations of the probabilities of each options drawing upon on predecessors' decisions. For instance, people may not *trust* predecessors' decisions (Hey et al. 2004). Thus, a decision to herd is much more complex than a yes/no choice and can be very subjective.

The above discussions lead us to two preliminary arguments: (1) that people consider both their private information and the actions of other people when making a decision, and (2) that people subjectively determine to what level they base their decisions on the action/decisions of other people. To explore this, we develop a new concept called **level of herding** to represent *the degree to which one follows others when adopting an IS*. Consistent with the conceptualization of herding in technology adoption, the level of herding is reflected by two dimensions: the *level of imitating others* and the *level of discounting one's own information* (Figure 1).

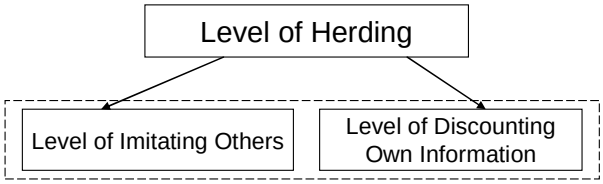

Figure 1: Proposed High-Order Nature of Level of Herding

RESEARCH MODEL AND HYPOTHESES

We developed a research model to study the impact of the level of herding on users' initial decision-making and the subsequent belief updates at the post-adoption stage. This model integrates the level of herding with a simplified Bhattacherjee and Premkumar's Cognition Change Model (CCM) (2004). Figure 2 depicts this new research model. In this paper, we focus merely on the new hypotheses associated with the level of herding. Readers can refer to Bhattacherjee and Premkumar's paper for the other relationships in the model.

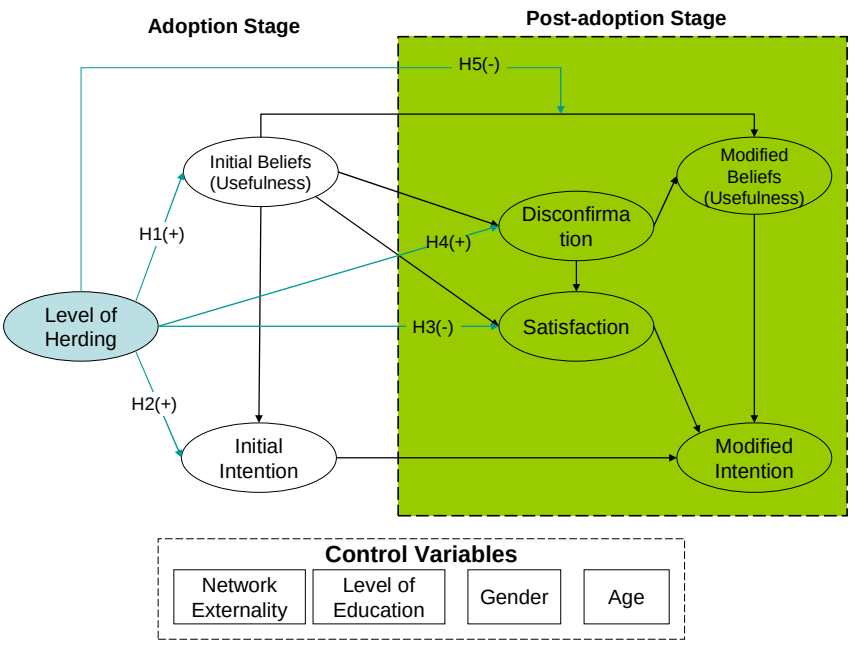

Figure 2: Research Model

People herd for different reasons. In studying bandwagon behaviors, Fiol and O'Conner (2003) argued that people join a herd to enjoy positive network externality (the adopted innovation is of more value when more people use it) and to avoid appearing isomorphic. The former reflects the pragmatic utility drives of joining a herd; the latter reflects the conformist behaviors driven by social pressures toward isomorphism (Abrahamson et al. 1993; Bernheim 1995; Fiol et al. 2003).

Herd behavior can partially be a social learning process. It has been found that organizations learn from other organizations by imitating their behaviors (Kraatz et al. 2001). Organizations may imitate other organizations in adopting fashionable technologies (Abrahamson 1991; Abrahamson et al. 1993). Kraatz and Zajac (2001) suggested that people can use active thinking when considering the adoption decisions of others: they internalize the information they collect from others' behavior. Consistent with Bhattacherjee and Premkumar (2004), this study focuses on user beliefs about the usefulness of a technology. People herd to cope with uncertainties, believing that other people know better, or have more complete information about the decision to be made. Observing that a lot of people are using a technology may make potential adopters perceive it as useful.

H1: At the adoption stage, level of herding is positively associated with initial beliefs (usefulness).

Herd behavior is characterized by people discounting their own information, or in other words, bypassing their own beliefs. That is, by following others, a person's decision becomes "less responsive to her own information" (Banerjee 1992 p.798). This means that when one herds in making decisions regarding the adoption of a technology, he or she bypasses his/her own beliefs about this technology and, instead, depends directly on the observations of the actions of others. Observing that people wait in line for days to purchase iPhones can strongly influence one's choices of a phone. People also herd to avoid social pressure for isomorphism. They do not want to stand out. Therefore, it is rational for a person to just follow other people's choices and discount his or her private beliefs. This is especially true when one's own beliefs are inconsistent with the observation of the actions of others (Banerjee 1992; Bikhchandani et al. 1998). With this all in mind, an immediate implication of herd behavior is that people can bypass their private information and still choose a technology, even such a choice would be inconsistent with their own beliefs about the technologies. This is modeled in this study as a direct influence of the level of herding on a person's intention to use, beyond his/her own beliefs.

H2: At the adoption stage, level of herding is positively associated with intention to use.

We can also expect that people who make decisions via herding are more likely to be unsatisfied with the decision later. As said earlier, individuals unfortunately "often converge on the same wrong action —that is, the choice that yields a lower payoff" (Bikhchandani et al. 1998 p. 154). Avery and Zemsky (1998) showed that herd behavior can lead to a significant, short-run mispricing in stock markets. Abrahamson (1991) argued that by imitating others, organizations may end up

accepting technologically inefficient innovations and rejecting efficient ones. Thus, it is reasonable to predict that the higher one's level of herding is, the more likely one is to choose an inferior technology based solely on herding, and thus is more likely to be unsatisfied with this IS later at the post-adoptive stage once more information about this IS has been accumulated.

H3: Level of herding is negatively related to user system satisfaction at the post-adoptive stage.

The fragility of herd means that people may revise their initial decisions at a later point and, if necessary, correct them. Duan and colleagues (2009) found that online users' choices of software products exhibit distinct jumps and drops with changes in download rankings. This may indicate that people are unsure about their initial choices. It is reasonable to predict that when people adopt a technology by herding, they are more likely to disconfirm their initial choice than someone who made their initial decision without herding. Disconfirmation refers to the dissonance between users' original expectations and observed performance (Bhattacherjee et al. 2004). It can be viewed as a "deviation from the initial expectation (Bhattacherjee et al. 2004 p.231). If one adopts an IS by imitating others rather than relying on his/her own beliefs, his/her adoption decision does not carry his/her initial beliefs. As a result, he/she is more likely to disconfirm the initial beliefs at the post-adoption stage when he or she has more information about this system.

H4: Level of herding in adopting an IS is positively associated with the disconfirmation of initial beliefs at the post-adoptive stage.

The theory of belief updating suggests that initial beliefs about an IS are the "anchors" and new evidence about this IS acts to adjust this belief. People incorporate the anchors and adjustments in forming the new beliefs (Kim et al. 2005). If a person herds in adopting an IS, the anchoring effects of his/her initial beliefs are weak. As a result, his/her later beliefs at the post-adoption stage rely less on the anchoring initial beliefs. Thus, we argue that:

H5: Level of herding weakens the belief updating mechanism; the higher the level of herding, the weaker the relationship between initial beliefs and modified beliefs.

METHODOLOGY

To examine our research model and hypotheses, we are conducting a longitudinal survey. The research technology being used is PBwiki (http://pbworks.com/), an online wiki system. A wiki system allows users to work on web pages alone or collaboratively. The survey has two questionnaires conducted at the adoption (Time 1) and post-adoption (Time 2) stages respectively, with a twelve-week interval in between. The first part of the survey measured level of herding, and initial beliefs and intent to use. Network externality was also measured as a control variable. The second part of the survey, conducted twelve weeks after the first part, is for measuring the post-adoption constructs including modified beliefs and intention to use, disconfirmation, and satisfaction.

The online survey is currently in progress. We have finished the first part of the survey for adoption stage constructs. We sent an invitation letter with the URL of the online survey questionnaire to about 450 individuals. To control for possible impact of demographic factors, invitees are limited to employed US residents across three occupational categories: banking, finance, and management. Incentives are provided that include five dollars for each participant and a drawing of five gift cards of 50 dollars each. 230 valid responses for the first part of the survey were collected, which is a response rate of about 50% percent. The second part of the survey is being conducted. A total of around 175 final valid responses are expected.

Measurements

Wherever possible, we utilized previously validated instruments. For the constructs in the original Bhattacherjee & Premkumar's Cognition Change Model (2004) ― including the initial beliefs and intention to use at the adoption stage and modified beliefs and intention to use, disconfirmation, and satisfaction at the post-adoption stage― we adapted measurements from their paper.

There are no validated instruments for measuring level of herding and network externality, so we developed instruments for them ourselves. Table 1 presents the self-developed measures. The instrument for level of herding covers the two aspects of level of herding: the level of imitating others and the level of discounting one's own information. Three items and four items respectively were developed to measure these two sub-constructs. We also self-developed an instrument for measuring network externality. The items for level of herding and network externality are measured by seven-point Likert scales with 1 representing "strongly disagree," 4 "neutral," and 7 "strongly agree."

Table 1. Self-Developed Measures *

Construct	Sub-construct	Items
Level of Herding	Level of Imitating Others	IM1: PBwiki appears to be the dominant wiki system. I use it because of this.
		IM 2: I choose PBwiki because PBwiki has already been accepted by a lot of people.
		IM 3: I follow others in accepting PBwiki.
	Level of Discounting Own Information	DT1: My acceptance of PBwiki does not reflect my own preferences for collaboration tools.
		DT 2: I did not rely on my own information about PBwiki in making the decision of accepting it for collaborative work.
		DT 3: I choose to use PBwiki as a collaborative tool, even though I might have preferred a different one.
		DT 4: If I didn't know the popularity of PBwiki, I might have chosen a different wiki system for my work.
Network Externality		NE1: The more people use PBwiki, the more valuable it is to users.
		NE2: By adopting PBwiki, I help increase its value to others who have been using it.
		NE3: There are people I know who would be pleased with my choice to adopt PBwiki.
		NE4: By adopting PBwiki, I help make it more useful for people I know who also use it.
		NE5: I hope more people that I know will adopt PBwiki because that will increase the value of PBwiki to me.
		NE6: PBwiki will be more useful if more people adopt it.

* Measures for the other constructs in the research model are adapted from prior research and are not presented due to space limit.

DATA ANALYSIS AND RESULTS (IN-PROGRESS)

Partial Least Square (PLS) will be used for data analysis. Being a components-based structural equation modeling (SEM) technique, PLS is better-suited for explaining complex relationships as it avoids the problems of inadmissible solutions and factor indeterminacy (Liang et al. 2007). In addition, PLS is a powerful tool for incorporating moderating factors (Chin et al. 2003). Thus, PLS is chosen to accommodate the presence of a large number of variables and moderating effects.

Some preliminary results may be presented and discussed at the conference.

DISCUSSION

In adopting new technologies, people often imitate others and discount their own information about the technology. In other words, people may not rely on their own information about an IS to make decisions, believing that others may have a better understanding or more complete knowledge of the IS. Therefore, the existing research models of user technology adoption ―often assuming that people base their decisions primarily on their own beliefs― do not explain well the observed herd behaviors in technology adoption. This research systematically investigates how people herd when making decisions regarding adopting a technology and how they subsequently update their initial decisions at the post-adoption stage. We proposed a research model of herd behavior in technology adoption and continued use. Using a sample of individuals in three occupations (banking, finance, and management), an online survey is being conducted to examine this research model.

Contributions

This paper has conceptual, theoretical, and methodological contributions to IS literature. First, this paper conceptualizes a new idea, namely the level of herding. Based on economic literature on herd behavior, we defined the level of herding and conceived of it as a second-order reflective construct that has two sub-constructs. Second, we developed a theoretical research model of herd behavior in technology adoption and continued use. This model is an extension of Bhattacherjee & Premkumar's Cognition Chang Model (2004), incorporating level of herding. This model enriches our understanding of how people make decisions when adopting an IS and how they update their initial beliefs and intention to use at the post-adoption stage. Third, this paper has methodological contributions due to our development of new instruments for measuring the level of herding and network externality.

Future Research

Future research can study contrarian behavior. That is, people may sometimes seek to avoid joining a herd. For instance, financial analysts may intentionally avoid making forecasts that are too close to the publicly-available forecasts (Bernhardt et al. 2009; Drehmann et al. 2005). They may think that making the same forecasts as the public-available forecasts may make them look mediocre. Future research can address why people choose anti-herd behavior.

Another promising topic is the study of individual factors. After all, not everyone joins a herd and people join herd to different degrees. Studying who is more likely to join a herd is thus a valuable topic. For example, Fiol and O'Conner's research (2003) implies that mindfulness may influence one's decision about whether or not to join a herd. Future research can address the connections between such individual factors and herd behavior.

Future research can also investigate what happen after a herd collapses. We have emphasized the fragility of a herd in this paper; what would happen when the herd abandons a technology remain unaddressed. Some prior research suggested that despite the fragility of a herd, herding practices may have considerable staying power. When studying management fashions, David and Strang (2006) found that although people adopted the total quality management (TQM) in late 1980s more or less because it was 'in style,' they still practiced it well after the fashion of TQM faded in 1990s. They further argued that the fashion of TQM resulted in the "emergence of a hard core of knowledgeable TQM providers… to improve average program success, refine industry best practice, and increase the legitimacy of a technique suffering from disillusionment and skepticism" (p. 231). All these things make TQM well accepted. Positive network externalities ―that a technology becomes more useful when more people use it― also serve to reinforce a herd, increasing the value of the technology to people in the herd (Li 2004). Farrell and Klemperer's research (2004), on the other hand, suggested that, in some situations, people may not switch away from an adopted technology *en masse* as expected, because they may be locked in with this technology and are not willing to risk the switching cost (e.g., changes in efficiency). The above studies convincingly show that although people may adjust their beliefs about a technology, their behavior may not be as flexible as their beliefs. Many factors, such as the new recognized values of the technology, the standard, the switching costs, may hinder users from switching away from a technology that was adopted by herding.

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