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SATISFACTION AND CONTINUANCE IN AN ONLINE INFORMATION MARKET

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Abstract

Generating sustainable business value from information services is challenging on the web where free information and zero switching costs are the norm. This study examines the role of free comments given in a commercial information service through the lens of the expectation-confirmation theory and continuance. Data from the Google Answers web site is analyzed by structural equations modeling to test the theoretical model whereby customer satisfaction is key to continued use of the service. Customer satisfaction, in turn, is shown to relate to social interaction that takes place on the site. The model is supported by the field data retrieved from the site. The data show that people came with equal expectation, received equal service and continued to use the system if they were satisfied with it. Satisfaction was predicted by conversation. Free activity emerges as an integral part of the service in a fee-based information market, improving continuance, and thereby leading to measurable outcomes for the commercial owners of the site. The contribution of this study is twofold: First, the expectation-confirmation theory is extended by adding a social dimension to it, and second, the findings are based on unobtrusive field data rather than self-report questionnaires.

Keywords: Information Markets, Incentives for Participation, Expectation-Confirmation Theory, Satisfaction, Continuance

1   INTRODUCTION

Customer retention in internet-based businesses is especially challenging because usually alternative service or product providers abound and switching costs are minimal. This is particularly true for information services which tend to be commoditized with a price of zero. Nevertheless, paid information co-exists on the web with free information leading to the question: what is the role of free information in a fee-based information service? The claim in this paper is that free information plays a part in the formation of satisfaction by the service users leading to customer retention. Therefore, this study focuses on on the antecedents for satisfaction by the customers of a fee-based online information service and shows that the availability of free information by conversation catalyzes further fee-based market activity.

Users' explicit satisfaction from the answers they received is presented in a model supported by field data showing that consumers are socially motivated even when payment is involved. Social interaction emerges as an important driver of actual satisfaction and continued use of the Q&A site. The contribution of this paper is twofold: first, we extend the theory on *information user satisfaction* by adding a social dimension to it, and second, we examine actual satisfaction in real information transactions by using unobtrusive field data collection and analysis. The rest of the paper proceeds as follows. First, we explain the theoretical underpinnings of the present research to create the link between social interaction, satisfaction, and continuance. Next we describe the web site researched, the results and their implications.

1.1   Customer Retention and Continuance

Beyond finding new customers, retaining old ones is critical for sustainability, is an important long-term strategy, is important for word-of-mouth marketing, and is much less expensive than soliciting potential new customers (Bhattacherjee, 2001a). One of the central tenets of customer retention is satisfaction. Satisfied customers tend to be loyal and continue using the same service or product. Satisfaction is a

measure of how well early expectations were met and it is known to be an important predictor of the intention to continue consuming products and services (R. E. Anderson, 1973; Bhattacherjee, 2001a).

However, satisfaction on the World Wide Web is not identical to known principles in the offline marketing world because the nature of interaction and communication in digital markets is different than that in physical markets. Customer retention in web-based business and particularly in information markets is challenging because the competition is open, explicit, and information-rich. Prior research addressed the link between satisfaction and consumer intention to keep on using products and services (R. E. Anderson, 1973; Taylor & Todd, 1995). The IS use literature dealt with similar questions (Bhattacherjee, 2001a; Davis, Bagozzi, & Warshaw, 1989). Another study, which focused on an e-learning service, proposed that users' continuance intention was determined by satisfaction, which in turn was jointly determined by perceived usability, perceived quality, perceived value, and usability disconfirmation (Chiu, Hsu, Sun, Lin, & Sun, 2005). In summary, the connection between satisfaction and continuance is well-established in consumer research and in IS research, but the latter did not examine the effect of personal interaction and communication on the consumers' satisfaction and also did not examine data derived from actual behaviour online.

1.2   Satisfaction in Information Markets

According to the well-known theory of expectation confirmation (ECT), which is also called expectation disconfirmation theory (EDT), satisfaction depends on meeting the pre-usage expectations of the consumer (Oliver, 1980). The expectations are compared with the post-usage perceived performance leading to a cognitive assessment which results in the affective state of satisfaction. When expectations are met satisfaction is higher than when expectations are disconfirmed. The assumption of ECT/EDT seems to be that satisfaction is derived from product or service performance.

Information is an experience good (Shapiro & Varian, 1999; Van Alstyne, 1999). Before using information the user may know about some technical features such as the length of the text, when it was created, name of author and so on. A user may use these attributes and other heuristics to form expectations prior to actual consumption. Then, the actual use of information is a subjective experience which leads to the formation of impressions translated into a degree of satisfaction which, in turn, is one of the central constructs of information systems' success (Delone & McLean, 2003). Satisfaction is a person's attitude toward a variety of factors of a situation affecting the person's subsequent behavior and repurchase intention. The literature on information system user satisfaction follows the tradition of ECT/EDT and mostly describes object-based beliefs and attitudes (Wixom & Todd, 2005) such as content relevance, accuracy, and timeliness.

The present work suggests that satisfaction grows also by social interactions in an information system. Stated price bids are taken as the representation of expectations. Price gives the answer provider a cue as to the level of effort expected by the asker in order to deliver a sufficient answer. Since price expresses expectation it is one of the predictors of satisfaction in the model presented in Figure 1. It is possible that in a paid system customers may return for more business simply because they feel they are getting cost-effective service. For this reason Figure 1 shows a possible direct connection between price and continuance, a connection which will be tested.

Another type of expectation known in the literature regards the waiting time to receive a service. Time is inversely related to satisfaction with services, however, this relationship is not obvious in regard to information because duration may signal more effort in searching and compiling the answer. If price bids provide a cue to answer providers as to the level of effort expected, then a positive correlation is expected between price and time spent in search of an answer. Yet, theory (Carmon, Shanthikumar, & Carmon, 1995) tells us that time is inversely related to satisfaction: people who wait less for service are more satisfied than those who wait longer. The hypotheses corresponding to Figure 1 account for this tension although in the special case of information provision, there may emerge a positive correlation between time and satisfaction.

The next section introduces the social driver of satisfaction and continuance.

1.3   Social Antecedents of Satisfaction and Continuance

There is a gap in time between the formation of expectations and the evaluation leading to the degree of satisfaction experienced. During this time the product or service is used and other things may occur which may influence satisfaction. For example, in the area of information transactions, conversation may occur and influence the level of satisfaction. Earlier research has shown the importance of the user experience and specifically of social presence and conversation in e-commerce web sites explaining the importance of social activity to business (Jiang, Wang, & Benbasat, 2005; Kumar & Benbasat, 2002). Virtual presence in online English and Dutch auctions was shown to encourage more efficient markets (Rafaeli & Noy, 2005). Research in Q & A sites (Author, 2008) exposed the finding that individual information producers are motivated to some degree by conversation even in the presence of monetary incentives. Conversation was found to promote persistence in providing information. In addition, it has been established that users contribute more online when they feel a social environment rather than contributing to a database (Connolly & Thorn, 1990).

Taking together the earlier studies about presence in e-commerce and the effect of conversation on information producers, it stands to reason that their market counterparts, the information consumers who are their conversational partners, may also factor social interaction into their overall feeling of satisfaction, and tend to continue using the information service. Therefore, in the current study conversation that occurs before a paid answer is taken as an antecedent of the users' expressed satisfaction with the answer. Further support for conversation as an explaining variable is based on the assumption that conversation may contain parts of the desired information thus enhancing the paid answer. This raises the question whether conversation is a predictor of satisfaction which leads to continuance or whether conversation is a direct predictor of continuance. Figure 1 shows the two possible cases which will be tested.

In the present study the interaction is between an individual information consumer and the potential service providers as well as other visitors of the web site. The interaction occurs within a larger system that mediates the entire Q & A service and is believed to be an antecedent of satisfaction. The approach is to look at the actual expressions of satisfaction following real information transactions. The feedback that consumers provide after they receive the paid answers is taken as a measure of satisfaction. Three forms of feedback are available in our data set: ratings of answers received, gratuity payment, and brief textual feedback.

1.4   The Google Answers Information Market

The Q & A web site chosen for the present study is Google Answers (GA). GA was a hybrid, economic and social, information exchange which offered answers to questions by pre-selected search experts. It worked well with a steady increase in activity for more than four years. The service was shut down by Google at the end of 2006 with no official explanation. Maybe that Google simply lost interest in this small-scale project in order to promote other projects which were at a higher priority for the company. Another reason for the shut-down may have been the opening of Yahoo Answers, a free question & answer site. Regardless of the reason for discontinuing the service, Google left all the data online in the public domain and it serves as an interesting source for field data thanks to the unique combination of free social exchange of information and fee-based service. Given this unusual business model it is intriguing to learn what makes online question askers re-use the site. This question is particularly interesting in light of the popularity of the discussion about free information (C. Anderson, 2008). If free is so great, and search engines have always been free, why do people use paid search services?

In order to study the tendency to continue using the Q&A service we examine the difference in the first encounter with an information market (described later) between one-time users and returning users. The first encounter between a user and an information system is crucial as it is likely to influence the

decision to continue using the same system. This continuance decision is based on perceived usefulness but mainly on satisfaction (Bhattacherjee, 2001a; Bhattacherjee, 2001b). Satisfaction was found to be a critical factor for establishing long term client relationship (Patterson, Johnson, & Spreng, 1997). The present study explores three possible antecedents to satisfaction: payment, time to answer, conversation prior to the paid answer. As explained earlier, direct links between payment, conversation and continuance are also tested in order to verify that satisfaction is key to the success of the information market.

1.5 Background Summary

The present research studies the factors leading to satisfaction and continuance in an online fee-based Q & A site which also offers free conversation. In GA we can observe and measure actual behavior by real information consumers who go through a full cycle of providing a price bid for the information needed, engaging in conversation, obtaining the paid answer, and expressing their satisfaction by three specific mechanisms. The price bids represent the askers' expectations about the effort needed to provide a sufficient answer. The answer providers see this signal and respond by a corresponding level of effort represented in this study by the amount of time needed to provide the answer. In the mean time free comments are exchanged. Finally, the askers employ three feedback mechanisms (tips, rating, and textual comments) to express their satisfaction. Subsequently, information consumers will decide whether to use the service again or not. Figure 1 captures the proposed relationships.
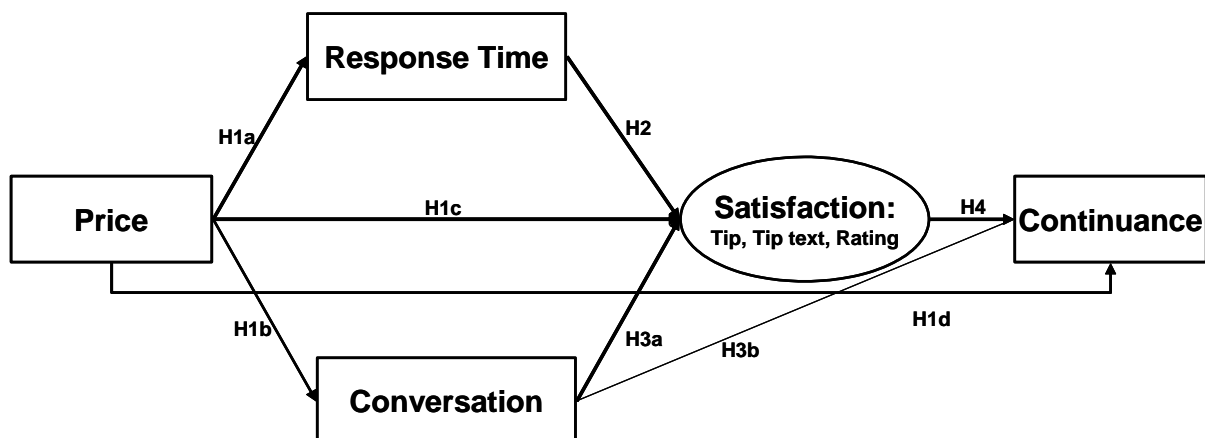

Figure 1: The proposed model to describe satisfaction, its antecedents and consequence.

The model in Figure 1 allows us to formulate the following hypotheses:

H1a: Price affects Response Time positively.

H1b: Price affects Conversation positively.

H1c: Price affects Satisfaction positively.

H1d: Price affects Continuance positively.

H2: Response Time affects Satisfaction negatively.

H3a: Conversation affects Satisfaction positively.

H3b: Conversation affects Continuance positively.

H4: Satisfaction affects Continuance positively.

2   METHOD

This study is based on analyzing field data from actual transactions that took place in the Google Answers (GA) Q & A web site during the course of four years of the site's activity. Although the service was discontinued by Google as of Dec. 1, 2006 the entire data is freely available via the World Wide Web (http://answers.google.com). Using field data from real transactions is a unique aspect and contribution of the current study as compared to previous studies that used self-report questionnaires.

The next sections will describe GA's mode of service, the variables extracted from it for the current study, the sample, and the method of analysis.

2.1   Google Answers

Google Answers (GA) was an online Q&A information system established in April 2002 and described by Google as: "*a way to get help from Researchers with expertise in online searching*" (http://answers.google.com). GA was selected for this research because it was a unique hybrid, social and economic, information exchange service which enables to see the way askers interact with the researchers, to track their tendency to be one-time or continuing users, and to examine their actual satisfaction and its antecedents.

The procedure for using the site was as follows. First, the asker would submit a question together with a price bid expressing his/her willingness-to-pay for the answer. One of over 500 GA researchers (GARs) would lock the question and search for information to form the answer. During the time it took the GAR to produce the paid answer (Response Time), any system user could submit comments, which were free-form conversation, not part of the economic transaction. Once the answer was submitted, payment was transferred (Google collected 25%) and the asker could provide feedback to the GAR. Feedback mechanisms included ratings on a scale of 1-5 stars, gratuity payment called 'tip' on the system, and text, which accompanied the tip.

2.2   Variables

The variables harvested from the system include:

Price: the dollar value of the asker's bid. Price is seen as an estimate of the effort needed to provide the answer and as an estimate of the value of the answer to the asker. It expresses the asker's expectation from the answerer in terms of time invested and quality of answer. The price bid for answers was not normally distributed. We observed that people evidently preferred to use round figures such as $10, 15, 20. In order to use this variable we recorded it as an ordinal variable with 9 levels (OPrice).

GARs' Response Time: the length of time needed for the GAR to perform online searches and formulate an answer for submission on the site. Due to the non-normal shape of the distribution of this variable we transformed it into an ordinal variable with 8 levels (IDRT).

Comments: free-form conversation directed at the asker. Any GA active participant or visitor and any GAR could post comments. For the present study only comments sent before the answer was submitted were counted since we wanted to observe if there is a relationship between comments and answer feedback. We observed the variable in its natural shape except for the questions that got more than 10 comments which we recorded as one group (0.4% of the sample).

Rating: a social feedback mechanism using a scale of 1-5 stars to indicate the asker's satisfaction with the answer received. Most the answers were rated 4 or 5 stars (91.3%). We recorded the variable into dichotomous scale of rated (44.9%) or not rated (55.1%).

Tip: a socially-motivated monetary reward expressing gratitude and indicating that the answer has exceeded earlier expectations which were previously expressed by the price. Based on the tip distribution, the tip was recoded into 5 ordinals groups – $0, $1-4.99, $5- 9.99, $10-99.99 and $100.

Tip Text: another social feedback mechanism providing a comment to accompany the monetary tip.

Figure 2 contains a screenshot from GA which illustrates the feedback mechanisms as they were displayed on the web site (this example is from GA question number 238877).
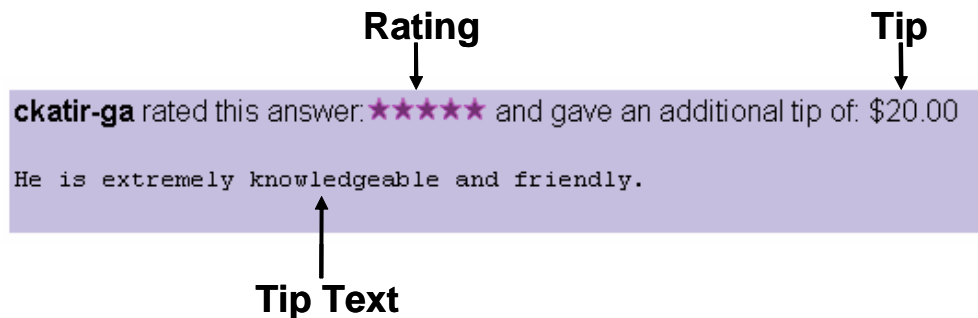

Figure 2: Example of feedback mechanisms on GA.

Satisfaction: a latent variable composed of the three feedback indicators: Tip, Tip Text, and Ratings.

Continuance: the dependent variable determined by the dichotomy: continue or discontinue using the GA service (i.e. ask one question or more than one).

To summarize the variables, there are three pre-answer variables: Price, Response Time, and Comments, three post-answer variables which are combined into Satisfaction, and the dependent variable, continuance.

2.3 Sample

In order to examine the research hypotheses all of the *first time* askers that received an answer for their question were entered to the study (N=27,368). Of those askers 72.2% were a one-time users only of the GA service, meaning that they have asked only one question and did not continue using the site (N=19,770). The other 27.8% of the population asked more than one question at the GA site (N=7,598) – those are the continuing users. The number of questions they submitted ranged from 2 to 513 questions per asker.

The following analysis pertains only to the first Q & A set for each asker.

3 RESULTS

3.1 Descriptive Statistics

We compare the antecedents and feedback of the first question submitted to the site between two groups of participants: one-time users vs. continuing users.

Price: By definition the GA system allowed askers to bid a price of $2-200 US per question/answer. On average the one-time askers bid $21.27 per question (s.d.=34.55) and the continuing askers bid $23.22 (s.d.=35.95). Since the sample included all the first time askers population the effect size was checked by Cohen's *d* (Cohen, 1992). There is no statistically significant difference between the groups with regard to the price that they bid for the first question (Cohen`s *d*=0.05).

Response Time: On average, one-time askers got an answer in 25.63 hours (sd=61.76) and the continuing askers got an answer in 24.29 hours (sd=58.26). There was no statistically significant difference in response time between the two groups (Cohen`s d=0.02).

Comments: The range of comments per question (before receiving an answer) was between 0 and 60 comments. 55.8% of the questions got a least one comment. The comments were largely on an ordinal scale. A chi square test indicates that there is a connection between the number of comments per question and the tendency of the asker to be a one-time asker or a continuing asker (chi^2=61.49, df=10, p<0.001). While more than half of the one-time askers did not receive any comments (55.2%), 51.7% of the continuing askers received no comments. Moreover, continuing askers tended to get more comments than one-time askers at any other level of the additional 9 levels of comments. The first question of the continuing askers invariably received more comments than the first question of the one-time askers.

Tip: the range of allowed tip in GA was between $0 (44.9% of the sample) to $100. On average, continuing askers received a tip of $1.89 per answer (s.d. 7.46) and one-time askers were tipped $1.03 per answer (s.d. 4.96). This is less than a 'small' effect with Cohen`s d=0.14 (a 'small' effect is defined as d=0.2). Nevertheless, the effect is somewhat stronger than the effect seen for price and response time. A chi square test indicates that there is a connection between the level of tip per answer and the tendency of the asker to be a one-time asker or a continuing asker (Chi^2=280.02, df=4, p<0.001). While 74.2% of the one-time askers paid no tip, only 25.8% of the continuing askers did not pay any tip.

Rating: 55.1% of the askers rated the answers that they got using a range of 1 to 5 stars. A chi square test indicates that there is a connection between the rating the answers and the tendency of the asker to be a one-time asker or a continuing asker (Chi^2=1172.35, df=1, p<0.001). While 82.5% of the one-time askers did not rate the answer only 17.5% of the continuing askers did not rate their answer.

Tip Text: 72.2% of all the answers did not get any tip text. A chi square test indicates that there is a connection between provision of tip text following the answer answer and the tendency of the asker to be a one-time asker or a continuing asker (Chi^2=927.70, df=1, p<0.001). While 51.3% of the one time askers did not send tip text, only 28.3% of the continuing askers did not send tip text.

To summarize the descriptive statistics section, at the start of the Q & A process there are no differences between the two groups with regard to the price bid and response time for obtaining an answer. A first difference between the two groups emerges during the question processing and answering and is expressed as a difference in number of comments provided for the questions posted by each group of askers. Finally, the feedback provided following the receipt of an answer differs between the two groups in all three variables, Tip, Tip Text, Rating.

3.2   Research Model

The theoretical research model proposed in Figure 1 was tested using the AMOS Structural Equation Modeling (SEM) software version 6.0. Fig. 3 depicts the structural relationships among the study's variables. A latent variable, labeled "Satisfaction", represents the shared variance of three indicators that capture users' feedback after receiving an answer (tip, tip text and rating). The rest of the variables in the model were directly observed: initial price, response time, spontaneous comments by non-expert users in response to initial questions, and user's return to submit another question. Only statistically significant paths are shown (p<.001). The practical significance of certain paths is explained in the Discussion. Fit indices indicated a good fit of the model to the data: CFI =.97; NFI = .97; RMSEA = .07.
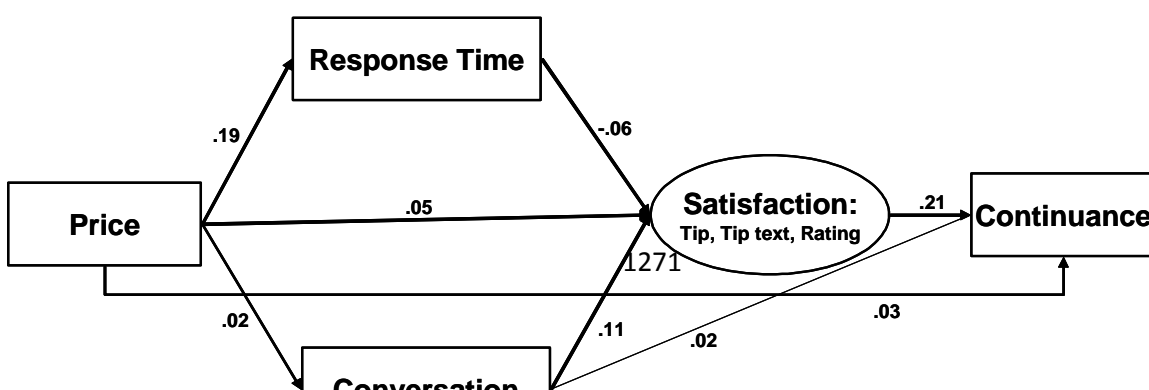
Figure 3: Outcome of the research model.

4   DISCUSSION

This study drew upon the expectation-confirmation or disconfirmation theory (ECT/EDT) in order to suggest that when information is the product or service in the market, social interaction is a crucial antecedent of satisfaction which ultimately leads to re-purchase (continuance) in the market for information. In other words, social activity promotes the sustainability of this information market. The findings of the present research extend the ECT/EDT which claims that satisfaction with a product or service is the primary motivation for its continued use (Oliver, 1980) by attributing satisfaction to social interaction rather than to attributes of the product or service itself.

Figure 3 reveals that all relations were statistically significant, however, most had a very low beta value meaning that the practical significance of those associations is probably low. Three relationships stand out compared to the others: price predicts response time, conversation predicts satisfaction, and satisfaction predicts continuance. The latter two connections mean that social interaction (comments) leads to increased likelihood of the asker to keep on using the Q&A service mediated by satisfaction.Conversation has a direct effect on continuance but a stronger effect which is mediated by satisfaction. Interestingly, the direct effect between price and satisfaction is weak, in contrast to ECT/EDT. This may be the result of the unique nature of information services compared to other services which relates to the perception of response time. For example, in a fast food restaurant one expects fast service, however, when asking a question, one may perceive a long response time as a cue for effort in preparing a thorough answer. The strong positive relation between price and response time supports this idea, whereas the weak negative relation between response time and satisfaction supports the traditional view that wait time and consumer satisfaction are inversely related (Carmon et al., 1995).

Overall, the beta values in the model are fairly low. This may be a weakness of the current findings, but put in perspective this is not so. Previous work linking satisfaction and continuance found much higher beta values for this specific relationship. The present links are weaker probably because field data was used, and as such it was not filtered. Had the data set been trimmed by certain parameters, for example, by taking only those Q&A sets that received feedback, the model may have resulted in stronger links. The weak link for the known relationship, satisfaction-continuance, implies that the weak link of the new relationship, concersation-satisfaction, has practical significance.

The model suggests several interesting observations and thoughts about the bid price. The price offered by the asker affects mostly the response time for receiving answers ($\beta=0.19$). The higher the price of the question the more time it takes the GAR to answer the question. This finding is not trivial because we may have expected the GAR to answer faster as the monetary incentive increases. The positive correlation between the question price and the response time suggests that the askers are able to correctly estimate the complexity of the questions and effort that the answerer will need to make in order to answer. Complexity and effort are translated to the amount of time needed to provide the answer.

It is possible that the answerers are investing more efforts on expensive questions in order to satisfy the askers, to provide added value. Looking at the askers' satisfaction in Figure 3 we see no direct connection between the response time of the answer to the tendency to keep on using the Q & A service, however, there is a weak negative connection between the response time and the satisfaction of the askers (β=-0.06). Faster response time generates higher asker satisfaction. This weak relationship suggests that although the askers estimate the complexity of their questions they appreciate quick answers.

The main predictor of the level of satisfaction is the number of comments per question provided before the paid answer (β= 0.11). Receiving more comments leads the asker to express more satisfaction. The submission of comments is a social process which is more conducive to information sharing than an interaction with a database or information system (Rafaeli & Raban, 2005). Human interaction increases satisfaction according to this interpretation. Additionally, the comments provide the pooled knowledge of several GA participants beside the asker and the GAR. Collective wisdom may generate more satisfaction than an answer by a single professional (Harper, Raban, Rafaeli, & Konstan, 2008).

4.1 Limitations and Future Research

Research that relies on a real data from a web site can be much more accurate and valid than a research that relies on surveys and other methods of self report due to the unbiased nature of the data. On the other hand, using data of this kind lacks the ability to observe additional variables that can explain some of the variance in the tendency to continue using an IS, such as personality, cognitive beliefs, affects, motivations and socio-demographics variables. This lack of data is likely the reason for the low but significant correlation in our research model. Future research may combine those variables with field data or field experiments to obtain a more detailed picture of the factors at play in such hybrid information exchange environments.

Another limitation of this research is its correlative nature. The use of correlative data, as oppose to experimental data, does not indicate the direction of the effects. Generally, the study presented here used the sequence of the users' actions as an indication for the direction of the model allowing us to draw directional conclusions.

Some of the links in the model are statistically-significant but very weak as expressed in low beta values. As indicated earlier, even links that are known to be strong in the literature (satisfaction-continuance) are much weaker in the present work. It is suggested that the weaker links (price-satisfaction, price-continuance, conversation-continuance) be more closely and specifically examined in future research, possibly a controlled study of information consumption.

4.2 Conclusion

The present findings show that there was no a priori difference between one-time askers and continuing askers in terms of their price bids and in terms of the time devoted to the answers provided to these respective groups. In the first use of GA users do not know if they will keep on using the system. The tendency to keep on using it stems from their satisfaction by the social interaction and the quality of the answer.

There was only a weak link between the price bids and the tendency to continue using the GA service. Most of the effect of the prices was mediated via the response time and the satisfaction. Satisfaction was predicted mostly by conversation. Conversation enables information sharing and motivates repeated business in the form of fee-based answers. The role of conversation is to provide interactivity which invites more interest and more activity, creates an amiable environment which generates more commitment and trust or credibility. A positive asker experience was expressed by the components of satisfaction and ultimately led to higher likelihood of continuance. Each of the feedback mechanisms was related to a higher chance of continuing to use the service, although since the model is correlative

we cannot determine whether the use of feedback mechanisms is the result of satisfaction or whether people who tend to use such mechanisms are more socially-oriented and more used to the online environment and the tools it offers them.

The important outcome of this study is that people came with equal expectations (represented by price), received equal service (represented by response time) and continued to use the system if they were satisfied with it. Satisfaction was improved by conversation. Referring back to the opening paragraph, free activity is an integral part of the service even in a fee-based information market. Moreover, free activity, especially social interaction, actually feeds into the site's activity improving continuance and thereby leading to measurable outcomes for the commercial owners of the site.

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