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Juan Mao

University of Kansas, maojuan@ku.edu

Gilbert Karuga

University of Kansas, gkaruga@ku.edu

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The effect of pricing online content on perceived information quality in online sites

Juan Mao
University of Kansas
maojuan@ku.edu

Gilbert Karuga
University of Kansas
gkaruga@ku.edu

ABSTRACT

Direct pricing of online content provides an alternative business model for providing online content. Its merits over the commonly used indirect pricing models are widely recognized. As more and more companies resort to charging users for information that was free in the past, we try to answer the following questions: (1) Will direct pricing online content itself affect the perceived information quality in online sites? (2) Will users' individual differences moderate the relationship between pricing online contents and perceived information quality? and (3) How does direct pricing of online content affect the perceived information quality in terms of accuracy, completeness, currency and format? Based on theories in IS and marketing, we develop a research model that extends our understanding of perceptions on information quality in information systems. Using an experiment and a survey, we intend to test several hypotheses on the effect of direct pricing of online content on users' perceptions of information quality. Our results will complement existing IS theories on information quality and also contribute to the practical world by studying online users' behavior and justifying companies' current or future decisions on pricing information services.

KEYWORDS

Perceived cost, price, perceived information quality, online content

INTRODUCTION

McMillan (1998) said that "a large portion of Internet users share Goodwin's belief that freely available information is a central tenant of a democratic society. The culture of the Internet has long held that 'information wants to be free'. However, a growing number of content providers are coming to believe that 'information wants to be worth something'". Wang et al (2005) stated that the once well-sold business model of offering free content to secure advertisement revenues yielded rather disappointing results for most of the e-service providers and advertising revenues alone are insufficient to meet the bottom-line needs of a company for survival. As a result, more and more web operators such as Encyclopedia Britannica and NetZero have introduced users' subscription fee for access to online information and/or services. The big search engine giant Google said in an unofficial blog post that it will let publishers limit the number of restricted articles that readers can see for free through its search engine since many newspapers are considering charging online readers fees due to reduced ad revenue.¹

On the other hand, in a market economy, free of charge typically means indirect payment. Rafaeli and Raban (2003) said that "The cost of information can be direct, by paying a publisher or an intermediary, and it can be indirect. Indirect information costs include time spent not doing principal work while searching for information, using low quality information leading to further costs, and purchasing advertised products from site sponsors." Even if some information seems free (no monetary cost), you actually pay for it in terms of time, effort and other possible cost. For example, Kenney et al.(2003) calculated that the average cost of a reference librarian answering questions is \$42.24 per hour.

Next, the sole business model of providing free content might not meet the needs of all information users. When discussing the commercialization of government information (global weather data service), Weiss and Backlund (1997) said that "The policy advocating a diversity of sources and channels of information is based on the reality that no one supplier can design modern information products to suit the needs of all users. Instead, market forces and entrepreneurial energy are crucial for determining user needs and for experimenting in the marketplace with different distribution and marketing techniques and different value-added features in order to satisfy those needs". They also stated that the information activity of government, the for-profit sector of the economy and voluntary community can and must coexist in order to meet the information needs of all users.

¹ Google allows publishers to strengthen 'pay walls' by the Associated Press, 12/02/2009 <http://www.cnn.com/id/34235264>

Prices levied on information and information services may convey indication of information quality. Information products that are priced at different levels may actually have different features or may have different information quality in terms of currency or completeness. For example, 20-minute delayed stock prices are available on Yahoo free of charge, but real time stock quotes cost \$9.95 a month (Varian et al., 2004). Baum and Lyons (2004) also predicted that because users are willing to pay for information, and may perceive an added value to service simply because there is a charge associated with the service, commercial (information) services may succeed in the United States. Therefore, we believe that commercialization of information or specifically, fee-based information service is possible.

The success of websites and information systems is closely associated with information quality (e.g. Liu and Annett, 2000; DeLone and Mclean, 2003). Nicolaou and McKnight (2006) found that perceived information quality (PIQ) predicts trust belief and perceived risk, which mediate the effects of PIQ on intention to use inter-organizational data exchange. Tung and Chang (2008) found that perceived information quality is one of the critical factors affecting students' intention to use online courses. We believe information quality is especially important for fee-based Q & A sites. A survey by Wang et al. (2005) indicated that willingness to pay for online content or services is positively related to users' perception of convenience, essentiality, added-value, and service quality, and to their usage rate of a given service. However, there is a dearth of research on the effects and the antecedents of information quality in the ecommerce field (DeLone and McLean, 2004). Nicolaou and McKnight (2006) also noted that past research has done little to study specific antecedents of PIQ. This was confirmed by our literature review. We found limited research findings regarding the effect of pricing online contents (commercialization of information) on PIQ. We also believe that the economic analysis of business models for online content systems disregards the behavioral implications of competing models, and therefore provides an incomplete assessment of the costs and benefits of alternative models. It has also been largely assumed that online information content will always be freely available to users, and the focus was on making a viable business model around that belief. This is increasingly not the case. Several sites are providing content where users are required to pay a direct fee to access it. With the acknowledgement that direct priced content is inevitable, our study attempts to answer the following questions:

- As more and more companies start to charge users for online information, will users perceive information quality of online sites differently due to price (cost) signal?
- Which factors (individual factors) moderate the relationship between pricing online contents and perceived information quality in online sites?
- How does direct pricing of online content affect the perceived information quality in terms of accuracy, completeness, currency and format?

By answering the above questions, we will make contributions to theories that advance our understanding of information system in general and e-commerce research in particular. If users relate pricing of content to the quality of information they expect to get, then we need to extend our analyses of competing models for online content provision to incorporate this finding. Our study specifically extends the model of Nelson et al. (2005) by adding an antecedent (price). We want to see whether the model will be changed by introducing the price signal. For example, will the positive relationship between format and information quality disappear after adding price as an antecedent? In this way, we can enrich theories of IS about information quality. Practically, our findings will be useful for online information providers as well. Companies can focus their marketing activities on potential consumers such as those with lower information literacy (or computer self-efficacy) and thus make their business successful.

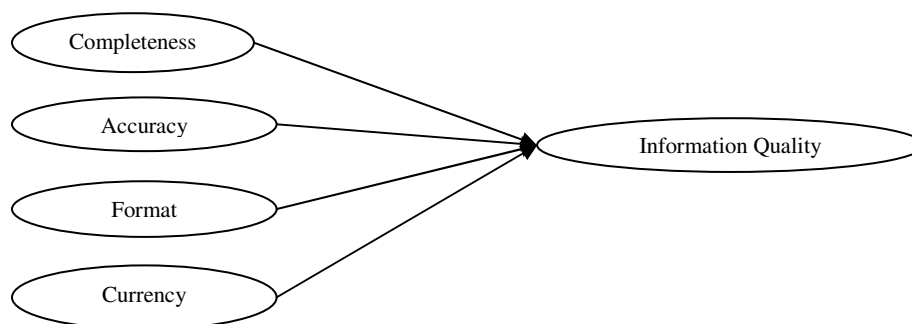


Figure 1: Part of the Model by Nelson et al. (2005)

THEORETICAL DEVELOPMENT

Our literature review is based on two streams of research. One is information quality research in IS field. We also reviewed research on the price-quality relationship within the marketing discipline.

Information Quality

A lot of studies have been done regarding the dimensions of information quality (e.g. Wang and Strong, 1996; DeLone and McLean 1992, 2003; Nelson et al., 2005; Kim and Han, 2009). Taylor (1986) identified five “values” as dimensions of quality: accuracy, comprehensiveness, currency, reliability, and validity. Wang and Strong (1996) provided a hierarchical framework of data quality (DQ): intrinsic DQ, contextual DQ, representational DQ and accessibility DQ. Wang (1998) further said that information quality has been viewed as fitness for use by information consumers, having the same fifteen dimensions as data quality has. Eppler and Wittig (2000) found twenty information quality frameworks that define and categorize quality criteria for information in various application contexts. Simplifying the model of Wang and Strong (1996), Nelson et al. (2005) found that completeness, accuracy, and format are significant drivers of information quality for predefined reports, query tools, and analysis tools. Nicolaou and McKnight (2006) defined perceived information quality (PIQ) as cognitive beliefs about the favorable or unfavorable characteristics of the currency, accuracy, completeness, relevance, and reliability of the exchange information after reviewing literature in information integration, data quality and information quality. They said that past research has done little to study specific antecedents of PIQ and their results show that control transparency but not outcome feedback has a significant influence on PIQ. Table 1 is a list of articles studying the antecedents of PIQ by different researchers. Several studies have been done to treat information quality as an independent variable. For example, Lederer (2000) found that information quality predicts usefulness for revisited sites. However, to our best knowledge, little research has been done treating the cost of information provision as an antecedent of information quality in IS research. In this study, we introduce pricing information content (perceived cost) to the model of Nelson et al. (2005) to evaluate its impact on perceptions of information quality and other model relationships. We specifically select the model of Nelson et al. (2005) as it is parsimonious and relevance to online content systems.

Author(s)	Study Method	Independent Variable(s) (IV)	Dependent Variable(DV)
Maltz (2000)	Survey	Communication frequency and modes	PIQ
Bovee (2004)	Survey	Perceived Interpretability and Integrity of information	PIQ
Nicolaou and McKnight (2006)	Experiment	Two system design factors: control transparency and outcome feedback	PIQ
Lim (2007)	Survey Quasi experiment	Telepresence, screening capability, channel trust , cognitive overhead of consumers	PIQ
Hyejeong and Niehm (2009)	Survey	Website quality dimensions: interactivity, online completeness, ease of use, and entertainment	PIQ
Lee et al. (2009)	Survey	Utilitarian and epistemic motivation	PIQ (four dimensions)

Table1: Studies of Antecedents of Perceived Information Quality (PIQ)

Price-Quality Relationship

Marketing research shows that direct effect between price/perceived cost and quality might not exist. Monroe and Krishnan (1985) contend that most past price-perceived quality research has not succeeded in resolving the question of when price is used to infer quality. Contingencies affecting the use of price as a quality indicator fit into three groups: informational factors, individual factors and product category factors. Informational factors refer to other information available to users such as intrinsic cues, brand name and level of advertising. Individual difference factors may account for the variation in the use of price as a quality signal such as price awareness of the consumer. Also consumers appear to depend more on price as a

quality signal in some product categories than in others. Zeithaml (1988) made a nice summary regarding the relationship between price and quality and proposed that the use of price as an indicator of quality depends on: (1) availability of other clues to quality; (2) price variation within a class of products; (3) product quality variation within a category of products; (4) level of price awareness of consumer; and (5) consumer's ability to detect quality variation in a group of products. We select the moderators mainly based on the theories of Monroe and Krishnan (1985). Since we focus on information products, we don't consider the product variation. To simplify our model, we also removed the effect of other information cues by assuming that information is provided by companies with similar popularity or reputation. Therefore, we only select individual factors as the contingent factors in our model. Culnan (1983) also found individual difference and task difference between users who accessed the database directly and/or indirectly through librarians and those completely or never relying on librarians. When people are more educated and belong to the most professional organizations, they are more likely to search the database by themselves or both search by themselves and resort to librarians for help sometimes. Based on our literature review and the information context of our study, we specifically select information literacy, perceived risk and perceived information overload as the moderating factors between price/perceived cost and perceived information quality.

Perceived Cost

Toften and Olsen (2004) mentioned that several scholars proposed that cost include both monetary and nonmonetary costs. For example, Menon and Varadarajan(1992) state that in the acquisition of information, costs are perceived in "both monetary terms and nonmonetary terms such as time and energy expended". Rafaeli and Raban (2003) also said that the cost of information can be direct (by paying a publisher or an intermediary), and indirect in terms of time and opportunity cost. Consistent with this stream of research, we thought that perceived cost of information acquisition is composed of two parts: price and nonmonetary cost.

Information Literacy

Marakas et al. (1998) reviewed 40 studies on computer self-efficacy (CSE) and found that the majority of the research showed a relationship between CSE and some computer-related behavior. Tung and Chang (2008) found that CSE as well as PIQ are some of the critical factors affecting students' intention to use online courses. Kurbanoglu (2003) found that students' perceived self-efficacy for information literacy and their computer self-efficacy are correlated. In our study we retain information literacy as an independent predictor of PIQ because we believe that in the context of our research, it embodies efficacy as well. Kulviwat et al. (2004) said that "research shows that a consumer's ability to search increases search activity". We argue that if people have the self-efficacy (ability) to search by themselves, it is more likely that they will search by themselves instead of paying for information. Therefore, they will Google instead of submitting question in paid online Question and Answer sites or other fee-based sites. This is also consistent with Culnan (1983) who found that users who are more educated are more likely to access the database directly instead of only resorting to librarians. Therefore, the positive effect between price and perceived information quality in online sites will decrease or become non-significant if users perceive that they have knowledge and ability to search information online. We therefore hypothesize that:

H1a: Among people with higher information literacy, there is no (or weaker) relationship between price and information quality.

H1b: Among people with lower information literacy, higher price is related to higher information quality.

Perceived Risk

Perceived risk has different meanings in different contexts. Mitchell and McGoldrick (1996) defined it as "the level of perceived risk is a product of the degree of uncertainty and the extent of consequences that would result from a wrong decision" while Chen (2008) argued that perceived risk is composed of privacy concern and security concern. In our study, we define perceived risk as risk of not making the right decision due to lack of information. Zeithaml (1988) said that research has shown that when perceived risk of making an unsatisfactory choice is high, consumers select higher priced products. Wang et al.(2005)' finding that willingness to pay for online content or services is positively related to essentiality and to their usage rate of a given service also implied that when information is important and perceived risk is high, users are more likely to pay and associate higher price with higher information quality. Base on this review, we hypothesize that:

H2a: Higher price is positively related to higher information quality for people with higher perceived risk.

H2b: No or weaker relationship exists between price and information quality for people with lower perceived risk.

Perceived Information Overload

Information overload has been a big concern since the advent of Internet. It can be argued that this is largely as a result of the free content provisioning. Gates (2006) said that "Companies pay a high price for information overload and underload. Estimates are that information workers spend as much as 30 percent of their time searching for information, at a cost of

\$18,000 each year per employee in lost productivity. Meanwhile, the University of California, Berkeley predicts that the volume of digital data we store will nearly double in the next two years.”² Maltz (2000) found that if marketing managers communicate too much, they may overload the non-marketing managers with too much information and erode the overall quality of the information sent. One of the symptoms or effects of information overload is limited information search and retrieval strategies. Edmunds and Morris (2000) suggested the provision of value-added information (filtered by software or information specialists) to reduce information overload. The approaches using filtering software or recommendation systems can be seen as technical solutions to address the problem of information overload. The major shortcoming of such approaches is the inherent limitation of real-time consumer input in the determination of content. Several other studies also suggest customization of information. Online fee-based Q & A site “experts” are either experts in some field or excellent searchers. To some extent, they provide value-added information tailored to users’ need.

Suria et al. (2003) noted that “Though several researchers have shown the debilitating effects of information overload in conventional media, no one has explored the effects of information overload on consumer evaluations (particularly of price) in an online environment.” Their results indicated that the interaction between motivation to shop and information load significantly influenced price perceptions. For the motivated subjects, a high price level was evaluated as higher in value when the information load was excessive. On the other hand, when the motivated subjects did not have an excessive information load, they evaluated the low price level as better value. For less motivated subjects, the high price level was perceived higher in value and quality than the low price level. Lim (2007) found that the cognitive overhead (i.e. Information overload) of consumers has a negative effect on information quality. The antecedent ‘perceived completeness’ and the moderating factor ‘information overload’ may have some contingencies. If the information overload results from the quantity of topical information provided by the content site, such contingencies are conceivable. But if the information overload is due to too many ads or other irrelevant information, higher information overload may be negatively related or not related to perceived completeness. While we acknowledge this contingency, we control the sources of information overload by manipulating information overload through increasing the number and types of ads and sponsor links that do not contribute to the completeness on the information sought by the user. Within our research framework, we see information overload affecting perceptions of information quality in the following way:

- H3a: Higher price is related to higher information quality for people with higher perceived information overload.
- H3b: No or weaker relationship between price and information quality exists for people with lower perceived information overload.

Our overall research model is shown in figure 2.

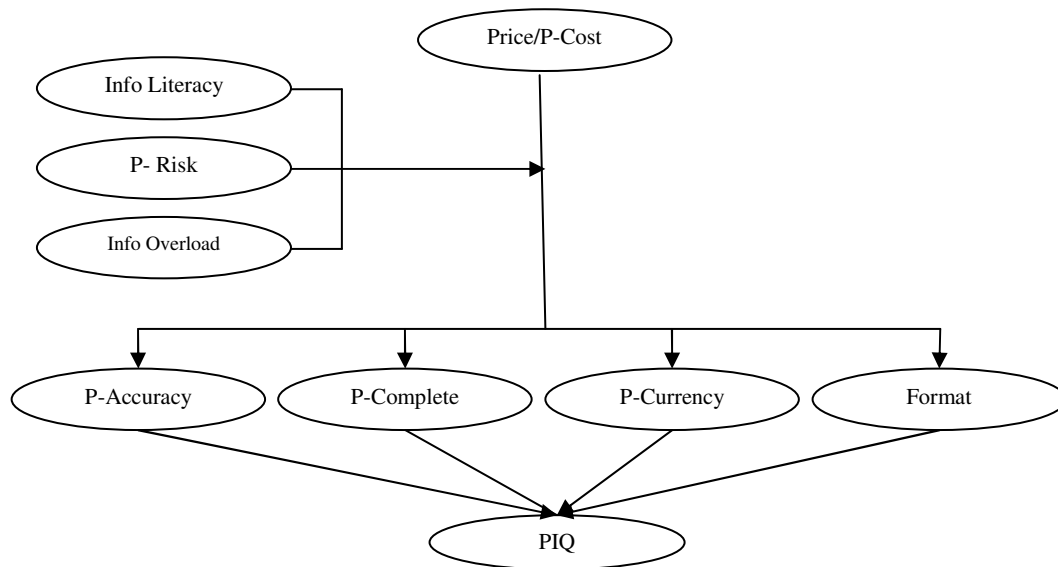


Figure 2: Research Model

² Gates, Bill (2006). Beyond Business Intelligence: Delivering a Comprehensive Approach to Enterprise Information Management. Published: May 17, 2006 <http://www.microsoft.com/mscorp/execemail/2006/05-17eim.msp>

RESEARCH METHOD

We plan to conduct an experiment to test our research model. We have designed the experiment using the procedures suggested by Cooper and Schindler (2006). We propose to conduct a 2 by 2 randomized experiment. Two factors (information price and information overload) will be used to design the webpage for experiment, with each factor being assessed at 2 levels. Table 2 is the two by two experiment design for this study. Participants will be randomly assigned to one of the four cells.

The treatments will be administered through the random exposure of each subject to one of four sample web pages that have been designed by the researchers based on the information overload and information price. After reviewing the webpage, each subject will complete an online questionnaire comprising of the measurement instruments for all the constructs in our research model. All constructs are adapted from other studies except that perceived cost was created by the researchers based on prior theory and other studies.

Perceived accuracy, perceived completeness, perceived currency, format and perceived information quality were adapted directly from Nelson et al. (2005) since we want to test how the model of Nelson et al. (2005) will be changed after we introduce price signal. Seven-point scale was used ranging from strongly disagree to strongly agree. Perceived risk was adapted from Mitra et al. (1999). It consists of five items. Six-point scale was used. Sample item is like "Considering the problem you have, how would you rate the financial risk of not acquiring accurate/timely information?" Information overload was adapted from Lim (2007). Seven-point scale was used ranging from strongly disagree to strongly agree. Sample item is like "The Website is crowded with content." Information literacy was adapted from ehealth construct of Norman and Skinner (2006). Five-point Likert scale from "strongly agree" to "strongly disagree" was used. Sample item is like "I know how to find helpful health resources on the Internet."

Perceived cost was created by the researchers. Items were selected and created on prior theory and related constructs. We divided perceived cost into monetary cost and nonmonetary cost. As with Sun and Marakas (2009), this instrument will be validated in the following areas: content validity, construct validity, and reliability. Pilot test will be taken before official launch of the survey online; confirmatory factor analysis will be conducted to ensure the instrument has convergent and discriminant validity; reliability coefficients will be generated to ensure the instrument's reliability. The survey respondents will be students in a big research university. Sample size will be about 160, consistent with the guideline of Kline (2003) for SEM analysis.

	Free site	Fee-based site
High information overload	40	40
Low information overload	40	40

Table 2. 2x2 Experiment Design

EXPECTED CONTRIBUTIONS

To the best of our knowledge, this paper is the first to empirically study the effect of pricing on perceived information quality. The phenomenon of pricing online content is increasingly becoming common as an alternative to content sites that are supported by revenues from advertisers. The results of this study will advance the theory on information quality and inform system developers on appropriate content revisions that may be required to satisfy the needs of consumers exposed to alternative content delivery methods. The findings will also fill the gap in IS research where scholars only study free information or simply assume that information is always free.

From the practical perspective, our finding will be useful for online information providers. The emerging business model of charging users subscription fee will be partially justified if users relate price to information quality under some situations. Further study regarding the relationship between PIQ and intention to use online fee-based information service will be done to ensure the feasibility of this whole business model.

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