

# Consumer adoption of group-buying auctions: an experimental study

Robert J. Kauffman · Hsiangchu Lai ·  
Huang-Chi Lin

Published online: 2 April 2010  
© Springer Science+Business Media, LLC 2010

**Abstract** Internet-based group-buying auctions enable consumers to obtain volume discounts, but they face risk and trust issues that are not present in other e-retailing formats, which affects their adoption by consumers. Bidders experience uncertainty about the final auction price, and the risk of whether the auction will be completed. We evaluate textual comments and the number of bids made in an auction as drivers of a consumer's perceived financial and psychological risks toward the group-buying auction mechanism and trust in the auction initiator. We use an Internet-based experimental test bed for online group-buying auctions and will report on one experiment that we conducted. Our results indicate that textual comments made by the participants about sellers in past auctions and existing bids affected a consumer's perceived trust in the auction initiator and the financial risk of the mechanism. Positive textual comments and more bids appear to enhance perceived trust in the auction initiator and reduce financial risk, and other consumers are more willing to make bids as a result. Consumers continued to express concerns about the uncertainty of the final group-buying auction price though.

**Keywords** Bids · Electronic commerce · Experiment · Group-buying auctions · Installed base · Network effects · Mechanism design · Ratings · Reputation · Risk · Technology adoption · Textual comments · Trust

## 1 Introduction

Dynamic pricing mechanism designs have been developed to enable buyers and sellers to interactively negotiate product prices [50]. Such mechanisms in e-commerce have the potential to outperform posted-price selling under some circumstances. *Group-buying auctions* on the Internet were introduced in the mid-1990s, as a market mechanism that collects consumers' orders to obtain volume discounts [34].<sup>1</sup> This mechanism enables retailers to minimize customer acquisition costs and to offload excess inventories. This business model for Internet-based selling has been fraught with problems that affect consumer willingness to adopt. Mobshop, Mercata and LetsBuyIt were all unsuccessful, though they were heavily funded [40]. Surprisingly though, group-buying businesses have been trying to make a comeback recently. For instance, a number of companies in the United States, including Pikaba ([www.pikaba.com](http://www.pikaba.com), active), the GroupBuyCenter ([www.group-buycenter.com](http://www.group-buycenter.com), inactive) and Sangabo ([www.sangabo.com](http://www.sangabo.com), inactive), GroupBuyDiscounts.com ([www.groupbuydiscounts.com](http://www.groupbuydiscounts.com),

---

R. J. Kauffman  
W. P. Carey School of Business, Arizona State University,  
Tempe, AZ 85287, USA  
e-mail: rkauffman@asu.edu

H. Lai (✉) · H.-C. Lin  
College of Management, National Sun Yat-sen University,  
No. 70, Lienhai Rd., Kaohsiung 80424, Taiwan  
e-mail: hclai@mail.nsysu.edu.tw

H.-C. Lin  
e-mail: wikey.lin@gmail.com

---

<sup>1</sup> We use the term *bid* to represent consumer behavior that involves sending an order to a group-buying auction. This involves specifying a price at which the consumer is willing to buy an item. It can also refer to the simpler act of being willing to buy the sale item at whatever comes out as the final price of the group-buying auction. The term *order* also is used to represent this idea in group-buying auctions in Taiwan: a consumer who places an order is making a commitment to be a purchasing participant in a group-buying auction at the final price of the auction.

inactive), Zag ([www.zag.com](http://www.zag.com), active), and Groupon ([www.groupon.com](http://www.groupon.com), active), have adopted group-buying in their core business models. (See “Appendix A” for some group-buying sites that were in operation in 2010 in Taiwan and the United States.)

In Taiwan, where the present research has been conducted, online group-buying auctions have become an especially interesting model for online transactions in recent years [9]. For example, the PTT bulletin board system (批踢踢 at [www.ptt.cc/index.html](http://www.ptt.cc/index.html)) has been an active group-buying auction platform in Taiwan. It had 360-plus group-buying recruiting posts in operation during January 2010. Other group-buying marketplaces in Taiwan include DinBenDon! ([www.dinbendon.net](http://www.dinbendon.net)), iHergo ([www.ihergo.com](http://www.ihergo.com)), TwDeco.com ([www.twdeco.com.tw](http://www.twdeco.com.tw)), and YLib.com ([www.ylib.com](http://www.ylib.com)).

The potential of group-buying auctions in Taiwan is evident from the following anecdotes. In its first month of operation in March 2007, iHergo was visited by 20,000 people and had 2,000 people register as members. By the end of its fifth week, 400 transactions had been made [9]. In May 2008, the average number of users exceeded 150,000 in DinBenDon! [16], with 2,300 participating consumers, who use it as an intermediary to buy lunch boxes. A bakery shop in eastern Taiwan sold about 4,000 Tiramisu cakes every day when it used a group-buying auction, though it had only been able to sell 100 a day before. In 2007, 60% of its sales came from group-buying auctions [3]. From the above anecdotes, we can see the extent of the current interest in the group-buying auction mechanism.

To give the reader a feel for some of the features that are operative in online group-buying auctions, we compare them to traditional auction mechanisms.<sup>2</sup> See Table 1, whose entries are ordered to convey the logic of the group-buying auction process. Kambil and van Heck [33] proposed five processes that occur in electronic markets and digital exchange: information search, authentication, price negotiation, payment and settlement, and post-transaction logistics. *Information search* represents the information gathering and evaluation processes by buyers and sellers to identify transaction-making opportunities. *Authentication* verifies the authenticity of the trading parties. *Price negotiation* involves buyer–seller negotiation and the discovery of a purchase and sale price for a product that permits an exchange transaction to occur. *Payment and settlement* defines the terms and method of payment permitted and ensures that value is exchanged in the

transaction. *Post-transaction logistics* is the process of specifying and coordinating shipment of goods from the seller and delivery to the buyer. Moreover, we include *price curve* and *auction duration*, which are always features of group-buying auctions, and the *role of the auction initiator*, which is specific to group-buying auctions in Taiwan and our research design.

Our research focuses on group-buying auctions that have an *auction initiator*. The initiator can be a seller, consumer, or a third-party like an auction house. The auction initiator must negotiate with retailers, recruit members, collect money from buyers in the group, arrange for shipping for buyers, and distribute sale items to buyers [62]. The auction initiator is important in the success of the auction. A group-buying auction uses a *price curve* to associate discounted unit prices with quantity demanded. Group-buying consumers benefit from bidding cooperation, unlike what occurs in English auctions, unless collusion to achieve lower prices occurs [10]. Everyone in the group pays the same final auction price. Without the participation of other buyers, group-buying auction participants will not be able to obtain lower prices, and a group-buying auction will be unsuccessful.

Online group-buying consumers face risk and trust issues that deserve close scrutiny. E-commerce generally creates risk due to incomplete, asymmetric or incorrect information, and uncertainty about the identity of the transacting parties or product quality. Compared to online transactions made under other mechanisms on the Internet, consumers are more uncertain about group-buying as a mechanism for organizing economic exchange [63]. *Price uncertainty* in group-buying occurs because the *final auction price* a consumer will pay for a sale item depends on the number of bidding participants; it will not be known until the auction closes [11, 12]. An insufficient number of participants may cause the auction to fail, with no final auction price reached and no transactional exchanges between consumers, even though they have made some bids. This can be frustrating and creates *psychological uncertainty* for consumers [48]. Also the auction initiator’s role is important, since the initiator may be a consumer and trust is required during the transaction process [6].

Consumers’ bids in a group-buying auction are an indication of perceived trust in the initiator and perceived risk toward the mechanism. The extent of auction participation and bidding shows the *liquidity* of the sale goods—a *network effect* [39]. In economics, positive network effects are generally associated with relatively larger installed bases of technology adoption and so on. Network effects increase consumer demand [44]. Microeconomic theory stresses the effect that the value of a unit of network goods increases with the number of units sold, and that a network participant’s utility will increase with the number of other

<sup>2</sup> The *traditional auction mechanisms* include English auction, Dutch auction, first-price sealed-bid auction, and Vickery auction. See McAfee and McMillan [50] for descriptions and comparisons of these auction types.

**Table 1** A comparison of traditional and group-buying auctions on the Internet

Criteria	Traditional auction	Group-buying auction
Auction initiator	The auction initiator is usually the seller	Auction initiator may be seller, consumer or third-party. Plays leadership role in group formation
Information search	Handled by the online auction house	Handled by the group-buying auction house
Authentication	Auction house or intermediary authenticates sellers and buyers	Auction house or intermediary authenticates sellers and buyers, when function is used
Price curve	None	Seller offers discounted prices for number of units demanded, in descending price for higher bid quantities
Price negotiation	Buyers bid against each other, and only one bid wins the auction	Buyers form a group and cooperate in bidding. Price decreases with more bidders. All participants win the bid and pay the same final price, if the auction closes
Auction duration	No fixed duration. Auction ends when a bid is not contested by other bidders	Auction ends after the closing date and time, or when assessment of sufficient number of bids is made
Payment and settlement	Winning bidder pays the auction seller directly (e.g., eBay's process)	All winning buyers pay the auction house, which pays the seller. If there is an auction initiator, this party will receive payment first, and pay the auction seller later
Logistics	The auction seller distributes goods to the winner buyer directly	Seller distributes sale items directly to buyers. If there is an auction initiator, then it will distribute items

users participating [13, 18]. There is a connection to group-buying in this respect. The number of existing auction bids acts as *installed base* for participation, and is related to perceptions of trust and risk in group-buying [17]. The risks that consumers face are the final auction price, and whether the group-buying auction concludes successfully. *Existing bids* also may load on trust in the group-buying initiator. If there is little or no trust, there will be no bidding. So the number of bids may provide information on how much consumers trust the initiator and believe that the auction will succeed.

*Word-of-mouth* and *reputation* can also increase trust [15]. There are several types of online reputation systems for e-commerce, search engine, online news, etc. Auction websites eBay and Yahoo! use two common formats for online feedback systems. *Ratings* give a quantitative reading on reputation. *Textual comments* enable users to describe their evaluations in words. Seller ratings often influence product prices [43], and textual comments change the seller's pricing power [23]. Textual comments may provide detailed and valuable information that cannot be found from ratings. For example, when a consumer finds a negative rating for a targeted group-buying auction initiator, he might want to understand how it resulted. Did the initiator do something wrong? Or was the rating inappropriate? From textual comments, a consumer can learn about how much trust to place in the opinion and its initiator. This may help consumers to make decisions about participating in group-buying auctions. Textual comments from participants are known to be a valuable mechanism in electronic auctions [23], but their effects are still unclear when the initiator plays a key role in group-buying auction.

Generally speaking, there are three decision making points involved in group-buying auction consumer behaviors. One is whether to use group-buying auction as a means to purchase. A second is related to whether a person will express his or her intention to make a bid. A third is that the consumer will need to figure out what amount of money is appropriate to bid. Group-buying auctions offer discounts for consumers, but they are not always the most attractive mechanism for purchasing. We decided to focus on the second decision, and examine the following research questions. What are the effects of textual comments and existing bids on online group-buying auction bidders' perceived trust in the auction initiator and perceived risk toward the mechanism? What intentions to bid do group-buying auction participants express in based on their trust and the risks they perceive? To answer these questions, we executed an experiment to investigate how textual comments and existing bids affect consumer trust and risk perceptions, important issues in consumer adoption of group-buying auction mechanisms.

This paper is organized as follows. Section 2 discusses background theory for this research. We develop a series of hypotheses in Section 3. Then Section 4 describes our research designs and results for the experiment. Section 5 interprets our main findings, and Section 6 concludes.

## 2 Theoretical background

We next discuss the theory behind group-buying auctions on the Internet, online feedback mechanisms, network effects, perceived risks in transaction-making, and consumer trust.

## 2.1 The online group-buying mechanism

Demand aggregation and volume discounting are at the core of group-buying auctions [1]. Tsvetov et al. [62] indicated that there are two kinds of *protocols* in group-buying auctions. Under a *post-negotiation protocol*, consumers form a *bidding ring* [10] before negotiating with suppliers. Under a *pre-negotiation protocol*, a ring is formed after negotiations with suppliers are done. An auction initiator is often helpful in both protocols. When they are not trusting, bidders may decide not to participate in a purchase coalition.

Bidders must assess how much trust to place in the initiator, and must gauge the risk that the final price of the sale item will not fall far enough to enable the auction to reach a successful conclusion. Kauffman and Wang [39] observed a *price drop effect* when the quantity bid approached the next discount level, density and number of new bids increased. They may also be concerned about whether the auction will finish successfully. At the *end of the auction cycle*, participants also made more bids, knowing that it would come to a conclusion soon. These results suggest that consumers perceive risk and they make the relevant adjustments due to their risk aversion.

## 2.2 Online feedback mechanisms

*Word-of-mouth* is a channel for consumer communication that plays an essential role in influencing their behavior and purchasing decisions [30]. Through IT, the Internet provides consumers with platforms to exchange experience, opinions, and knowledge. This is *electronic word-of-mouth* [22]. Online reputation systems employ bi-directional communications as a basis for large-scale word-of-mouth networks [15]. This approach has been widely implemented and is used for building trust in e-marketplaces. Such mechanisms provide ratings and textual comments about the behaviors of all parties to a transaction. eBay and Yahoo! have adopted this approach for online auction users to evaluate the risk of making transactions.

There are two kinds of feedback that characterize word-of-mouth. *Positive feedback* comes when a consumer is satisfied with a transaction. *Negative feedback* is a way that a consumer can complain if things do not work out so well. A good reputation on eBay is known to mean that eBay buyers trust the seller more [6]. Consumers are likely to exhibit higher willingness-to-pay as a result. Negative feedback, at the same time, undermines willingness-to-pay [51]. Pavlou and Dimoka [54], Ghose et al. [23] and Archak et al. [4] also showed the same pattern of textual feedback. Based on the data from eBay and Amazon.com, they pointed to the value of textual comments, which

reveal more information to consumers. Consumers value textual comments over ratings scores.

Consumers have to accept higher risks online than in face-to-face transactions. They have concerns about trading partner identity and product quality, for example. A feedback mechanism, in this context, can provide valuable information to control transaction risk. Positive reputations for sellers may indicate a lower level of risk while negative feedback may be a warning.

## 2.3 Network effects

Network effects occur when the number of agents who take similar actions affects the value of an action that an individual takes. It signifies that the value of a unit of network goods increases with the number of network goods that are sold, adopted and used [18, 47].<sup>3</sup>

Kauffman and Wang [39] posited that the presence of network effects in group-buying auctions will have beneficial consequences. Consumers will express a greater willingness-to-bid in a group-buying auction as more bids arrive and greater consumer participation ensues. In all of these network settings, positive network effects arise due to the fact that network participants' utility increases with the number of other users [13]. For positive network effect to accrue, the extent of the *installed base of users*—the number of users of a product, a service, and so on—will be a critical factor [18]. Installed base is the foundation of value and utility for network products. It typically will influence consumer decision-making as well. So in the online group-buying auction context, the more people that are willing to participate by making a bid on a given product, the more value the auction will be perceived to have by the seller and the buyers. The participants' willingness-to-bid will increase due to their perception that the auction will succeed.

## 2.4 Perceived risk in transaction-making

*Risk* involves uncertainty in transaction-making. *Perceived risk* refers to the nature and amount of risk perceived by consumers in deliberating a particular purchase decision [14]. Before purchasing something, a consumer usually possesses some kind of purpose for making a purchase. They may not be able to ascertain if they will be able to make a purchase, and this will give rise to feelings of risk and uncertainty. A consumer's perceived risk is *multi-dimensional* and varies depending on the context that is

<sup>3</sup> The literature distinguishes between direct and indirect feedback and uses distinct terms for each. A *network externality* is used to identify the direct impacts of growth in a network, while the term *network effect* is used to indicate indirect impacts of network growth [35, 36].

under consideration for purchase. Group-buying auction consumers, for example, usually face the uncertainty of product price and the uncertainty of the conclusion of the auction. As a result, there are two types of risks that consumers will meet in group-buying auction. *Financial risk* is a common element of risk. Consumers may be unsure of what they will have to pay, what a product is worth once they have bought it, what is the possibility of monetary loss arising from shopping, and so on [14, 48]. *Psychological risk* is the possibility that individuals suffer mental stress because of their purchasing behavior. For example, consumers are likely to be frustrated and dissatisfied if they make a poor purchase choice, or if their purchases are unsuccessful.

## 2.5 Trust

According to the *Oxford English Dictionary*, *trust* is what you give to a person or an institution when you have a belief that someone or some organization is good, sincere, or honest, and will not try to harm or trick you, leading to financial, reputational or physical harm. Trust reflects positive outcomes that one can receive based on interacting with another party in an exchange relationship characterized by uncertainty [7]. In social relationships, trust is highly desirable. When uncertainty and information asymmetries exist in a transaction, trust is more than desirable—it becomes essential.

Though the Internet offers a convenient channel for transactions, the nature of e-commerce makes it hard for consumers sometimes to identify transaction partners. Therefore, trust becomes a critical factor in the e-commerce context. Three characteristics of trust are well-accepted in the literature [49], and also are relevant to group-buying auctions. *Ability* applies to the auction initiator, and assesses whether that person or organization is competent to effectively carry out the operational aspects of the auction process, so that it can be brought to a conclusion. For example, the competencies of interest may include negotiation with suppliers and recruiting participants. *Benevolence* points to the problem that arises when the auction initiator is not viewed as doing his best on behalf of other group-buying auction participants. Some initiators may be viewed as self-serving or self-interested, and thus consumers may not wish to bestow much trust on them. *Integrity* on the part of the auction initiator describes whether she is viewed as adhering to principles or rules that make sense to consumers. Such principles may be formally stated by the auction intermediary or may be informally applied. The latter may occur in settings where the online group-buying business model is less developed. Since the initiator plays the key role in group-buying auctions on the

Internet, trust is the *sine qua non* for consumers who wish to bid.

## 3 Model and hypotheses

We next explore the effects of textual comments in group-buying auctions. We also investigate the impact of existing bids on consumer perceptions of financial risk, psychological risk, trust in the auction initiator and willingness-to-bid. We previously noted that there will be a *positive network effect* in group-buying auctions: the larger the existing number of bids in a group-buying auction, the more impetus there is for new bids to arrive, all else held equal. If there are many existing bids, this typically will create momentum so that the group-buying auction will reach the final discounted price on the specified *price curve* [11]. This results in a greater likelihood of success for the group auction to finish. Thus, there will be less uncertainty for participants if they perceive lower risks.

Seeking information before purchasing is a means to avoid undesirable risk [14]. No research on information-seeking behavior in group-buying auctions has been conducted to date, to our knowledge. Other researchers [6] have reported that online word-of-mouth helps to prevent opportunistic behavior though. Regarding negative feedback, previous researchers have shown inconsistent results for rating scores [15]. A more accurate reading of what really is known here is that negative feedback may have no effects, it may lead to price reductions, or it may lead to a lower probability of completing a sale. Ratings typically only show the number of negative feedback comments; they do not include the details on their contents. Textual comments are a viable source of alternative information for consumers to gauge the risks involved in making transactions with others, and transacting in particular market and exchange contexts. Comments give consumers helpful details [54]. Again, no research on this topic has been done for online group-buying auctions.

We will compare the perceived financial and psychological risks that auction participants associate with both positive and negative textual comments, and investigate the effects of the degree and number of negative textual comments on perceived risks. We define *financial risk* as the possibility of monetary loss arising from bidding in a group-buying auction. For example, consumers may pay a higher price for a product compared to other shopping methods, or the price they expect to pay. Meanwhile, we define *psychological risk* as the possibility of mental stress because of the bidding behavior in group-buying auctions. For example, consumers may feel frustrated or dissatisfied when there are not enough bids by the end of the auction or when the auction does not successfully conclude.



### 3.1 Textual comments

Online reputation is a signaling mechanism in a world with uncertainty and risk [58]. Textual comments provide fine-grained evidence on the performance of the transaction environment. Positive textual comments suggest it is good for consumers. Negative comments are indicative of potential for harm [6, 54]. Unlike the rating scores of reputation systems, textual comments give consumers more flexibility to provide minor or major negative textual comments, instead of just a negative score [54]. A *major negative textual comment* consists of a strong complaint. A *minor negative textual comment* will be weaker. For example, “the auction initiator never distributed the sale items” is a major negative textual comment. “The auction initiator distributed the sale items, but this was three days later than I expected” is a minor negative textual comment though.

Positive textual comments tend to provide perceptions of a stable mechanism in risky trading environment [15] and lead consumers to perceive less risk. By the same token, negative textual comments suggest consumers may be harmed or short-changed in the purchases they make. A few negative comments suggest the presence of risk, and more negative comments should lead to perceptions of higher risk levels. Along these lines, a major negative textual comment from an evaluator should lead a consumer to perceive a higher level of risk than a minor negative textual comment would suggest.

In online shopping environments, active group-buying auction initiators are unlikely to have a large proportion of negative comments. They usually will have only one, or a few negative comments at the most. What will happen when a consumer sees a major negative textual comment versus several minor negative textual comments? Several minor negative textual comments may indicate a riskier situation. A major negative textual comment may reshape consumer opinions, in contrast, even if it occurs just once. To our knowledge, no research has investigated this issue to date.

We will compare the perceived financial and psychological risks that auction participants associate with both positive and negative textual comments, and investigate the effects of the degree and number of negative textual comments on perceived risks. We define *financial risk* as the possibility of monetary loss arising from bidding in a group-buying auction. For example, consumers may pay a higher price for a product compared to other shopping methods, or the price they expect to pay. Meanwhile, we define *psychological risk* as the possibility of mental stress because of the bidding behavior in group-buying auctions. For example, consumers may feel frustrated or dissatisfied when there are not enough bids by the end of the auction or

when the auction does not successfully conclude. With this in mind, we assert:

**Hypothesis 1a (Negative Effects of Positive Textual Comments on Perceived Risks)** *Positive textual comments have a negative effect on consumers’ perceived financial and psychological risks in a group-buying auction.*

**Hypothesis 1b (Positive Effects of Negative Textual Comments on Perceived Risks)** *Negative textual comments have a positive effect on consumers’ perceived financial and psychological risks in a group-buying auction.*

**Hypothesis 1c (Effects of Major and Minor Negative Textual Comments on Perceived Risks)** *Consumers perceive different levels of financial and psychological risks in a group-buying auction in the presence of a single major negative textual comment versus several minor negative textual comments.*

*Trust in counterparties* in Internet-based exchange is a critical factor in consumer behavior. Reputation systems are designed to build trust [6]. We also know that trust and reputation are highly related, and that a seller’s reputation matters [26]. A better reputation makes buyers trust sellers more, and as a result, they will be willing to pay a higher price for whatever they are planning to buy [43]. In addition, data from Amazon.com have shown that positive opinions tend to enhance the pricing power of sellers [4]. The data further suggest that with a good reputation come higher cheating costs, since there is value to be lost.

Tsvetovat et al. [62] indicated that trust in an auction initiator is a necessity for consumers to make decisions about bidding in a group-buying auction. Positive textual comments suggest that consumers are satisfied with the initiator’s performance; negative textual comments mean the opposite. Positive textual comments not only signal trust, but also encourage the auction initiators to guard their reputations [6]. So, compared with negative textual comments, consumers will have more trust in the auction initiator when there are positive textual comments [54]. Major or minor negative textual comments also may affect consumer perceptions of trust in the auction initiator. When active group-buying auction initiators have several minor negative textual comments, this may give consumers the idea that the initiator tends to make mistakes occasionally, and so may not be reliable. A major negative textual comment may diminish their trust further. A number of hypotheses related to consumer perceptions of *auction initiator trust* are worthwhile to assert:

**Hypothesis 2a (Positive Effects of Positive Textual Comments on Auction Initiator Trust)** *Positive textual comments have a positive effect on consumers’ perceived trust in a group-buying auction initiator.*

**Hypothesis 2b (Negative Effects of Negative Textual Comments on Auction Initiator Trust)** *Negative textual comments have a negative effect on consumers’ perceived trust in a group-buying auction initiator.*

**Hypothesis 2c (Effects of Major and Minor Negative Textual Comments on Auction Initiator Trust)** *Consumers perceive different levels of trust in a group-buying auction initiator in the presence of a single major negative textual comment versus several minor negative textual comments.*

### 3.2 Existing bids

The positive network effect in group-buying auctions that we discussed earlier indicates that the more existing bids there are, the greater the likelihood that the auction will receive additional bids. Similar to textual comments, the number of existing bids is also a proxy for the number of consumers who trust the initiator of the auction. Textual comments offer historic records while existing bids stand for current situation. This has a beneficial effect on consumers’ perceived risks with respect to the specific auction, and possibly toward the auction mechanism itself. A higher bid density will permit consumers to make more accurate forecasts of the final price of the auction, thus reducing their monetary uncertainty. Another beneficial effect is that it will attract more potential bidders and increase the likelihood that the group-buying auction will finish with enough bids entered, so consumers will be comfortable that the auction will finish. This leads us to state two additional hypotheses, this time dealing with the *effects of existing bids*, as follows:

**Hypothesis 3a (Effects of Existing Bids on Perceived Risks)** *More existing bids in a group-buying auction diminish consumers’ perceived financial and psychological risks.*

**Hypothesis 3b (Effects of Existing Bids on Perceived Trust in Auction Initiator)** *More existing bids in a group-buying auction increase consumers’ perceived trust in the auction initiator.*

### 3.3 Intention to bid

When consumers perceive risks, they face uncertainties and potential undesirable consequences. The risks then decrease the overall utility the consumers obtain from shopping [48]. This implies that consumers may not bid in a market when there appear to be some risks related to the transaction-making process. Gefen [20] supports this contention: perceived risk negatively affects consumer intentions to trade online. As a result, we assert a fourth hypothesis on the *effects of perceived risks*:

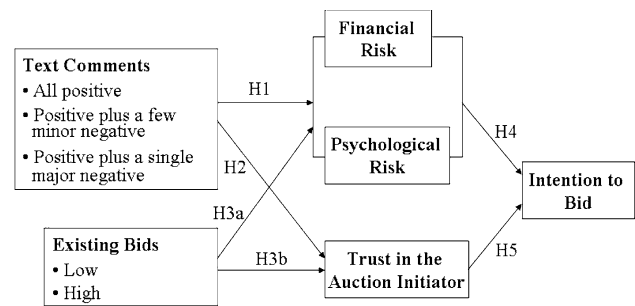


Fig. 1 Research model

**Hypothesis 4 (Effects of Perceived Risks on Group-Buying Auction Participation)** *Consumers’ perceived financial and psychological risks will diminish their intention to bid in a group-buying auction.*

### 3.4 Initiator trust

When a consumer’s assessment of the consequences arising from a behavior is negative, his attitude toward the behavior will be negative, and this will diminish his intention to act [5]. Jarvenpaa et al. [31] also remind us that if consumers do not have a positive attitude toward transaction-making, they will not have an intention to trade. When transacting in an environment full of uncertainty like online group-buying, trust will affect consumer attitudes. Trust represents a belief that the consumer will not be harmed, and that the initiator of the auction will act fairly and honestly. We suggest:

**Hypothesis 5 (Effects of Auction Initiator Trust on Group-Buying Auction Participation)** *Consumer trust in the initiator increases the person’s intention to bid in a group-buying auction.*

Our research model is shown in Fig. 1.<sup>4</sup>

<sup>4</sup> Alternate representations of our model may be possible. For example, some may view the perception of risk and trust as being highly correlated. When our trust in a given person or situation is low, we feel risk; and when our trust is high, we don’t. Thus, these two constructs could be represented as opposite ends on a scale for a single construct. Group-buying auctions are challenging to research in this regard. Consumers may prefer group-buying auctions but may not bid if there is an initiator whom they don’t trust. By the same token, they may trust the initiator but still may not believe that participating in a group-buying auction will be beneficial. Thus, simply treating risk and trust as highly correlated may not be meaningful for the setting that we chose to study. As a result, we chose to use *perceived financial risk* and *perceived psychological risk* to measure consumers’ *perceived risk* with bidding in a group-buying auction. This enables us to evaluate consumer attitudes toward the mechanism itself. In contrast, *perceived trust* would measure consumer trust in the auction initiator. We did not investigate the relationship between perceived risk and perceived trust. The purpose of doing so is different and also is beyond the scope of this study.

#### 4 Experiment: textual comments, bids, risk, trust, and intention to bid

We next discuss the research design, questionnaire, and results for our experiment, which examines how textual comments and existing bids affect consumers' perceived mechanism risk, in terms of financial and psychological risks, and trust in auction initiator. (See "Appendix B" for the setup of the experiment.)

##### 4.1 Research design

###### 4.1.1 Web-based experimental platform

This research uses a web-based experimental platform to understand consumer behavior in group-buying auctions. We recruited subjects from the online group-buying forums of a bulletin board system in Taiwan ([www.ptt.cc/index.html](http://www.ptt.cc/index.html)), which resulted in 1,048 valid observations after omitting subjects who did not satisfy our experimental requirements. See "Appendix B", Table 12 for descriptive statistics on the subjects. In our experimental scenario, subjects were asked to buy a small gift for their friend's birthday. The product is an imitation of Sega's iDog, a multifunctional MP3 player. We chose the product because it is a popular product and is expensive enough so consumers will want discounts when we conducted the experiment. See Fig. 2.

The experimental price curve was designed based on a survey of current market prices for the sale item. The list price of an iDog in the market in Taiwan when we conducted this experiment was NT\$1,800 (US\$1 = NT\$30) while the lowest price was NT\$1,400. Since consumers usually expect to see lower prices in group-buying, we designed a price curve that included a price with realistic shipping fees.

###### 4.1.2 Experimental manipulation

We examined the effect of textual comments and existing bids in  $3 \times 2$  factorial design. We randomly assigned



**Fig. 2** The auction item: a Sega iDog imitation. *Note:* For additional information, see [thegadgeteer.com/review/sega\\_toys\\_idog\\_mini](http://thegadgeteer.com/review/sega_toys_idog_mini)

subjects to different groups. We varied existing bids over two levels. When subjects were assigned to the group with a lower number of existing bids, they were told that there were already 1–5 bids. Subjects assigned to the group with a higher number of existing bids were told that there were 11–15 bids made already. We did not assign a group with 6–10 bids already made. The number of bids would have been too small for consumers to perceive any difference. We manipulated textual comments over three levels: all positive textual comments, positive comments plus several minor negative one, and positive comments plus a single major negative one. All textual comments about the iDog and initiator were collected from other e-market environments to emulate the kinds of textual comments real-world consumers typically write. We collected 22 positive and 14 negative textual comments. After modifying to adapt them for our experimental scenario, we selected 15 positive and 10 negative textual comments for a pretest with 22 subjects.

In the pretest, we asked the subjects to determine the extent to which each textual comments we presented to them was positive or negative. '1' was 'extremely positive', '5' was 'neutral', and '9' was 'extremely negative.' We conducted a *t*-test with '5' as the cut point to classify positive and negative comments. We categorized comments of significantly higher than '5' as negative comments. Those with significantly less than '5' were positive comments. We coded negative textual comments as *major* or *minor* relative to the average score of each negative textual comment. We conducted a *t*-test with '7.5,' the median of the pretest scale of negative comments, as the cut point to classify minor and major negative comments. A major negative textual comment was identified when the average score was significantly higher than '7.5.' A minor negative textual comment occurred when the average score was in between '7.5' and '5.'

Recognizing that most consumers do not read many textual comments, we decided to limit the number of positive textual comments to ten. Auction initiators cannot have many negative comments in real-world auctions, or they will be unable to operate auctions. So we used one major negative textual comment and three minor negative textual comments in our experiment. We showed our control group ten positive textual comments. The other two groups were shown one additional major negative textual comment, and three other minor negative textual comments, in addition to the ten positive textual comments.

We also told subjects that there was an auction initiator who is also one of the consumers in the group-buying auction, similar to what is observed in the real world. To enforce the subjects' perceptions of positive, minor negative, and major negative comments, we marked the textual comments with "stars." 3–5 stars indicated positive



comments, 1 or 2 stars indicated minor negative comments, and 0 stars indicated major negative comments. We told subjects that all textual comments were from other buyers in the group-buying auction. All comments were randomly displayed in our experiment.

### 4.1.3 Experimental process

The experimental process is shown in Fig. 3. The information provided to the subjects was divided into three parts. Part 1 introduced the group-buying mechanism and experimental process. Part 2 involved the incentive mechanism to encourage participants to take the experiment seriously. Part 3 gave details of the group-buying auction scenario to be used. The latter includes the product description, price curve, number of current existing bids, textual comments, and the experimental tasks of the participants. The subjects were to reveal their bidding intention, to make their decisions to bid in the auction, and to finish several questionnaires during the experimental process based on the information they received and the decision they made. The subjects in our experimental research context were not allowed to put in multiple bids. We presented the three parts of the experiment sequentially to subjects. There were three questionnaires that subjects had to finish. Each set of responses had to be submitted before a subject read the next part of the experimental materials. We allowed subjects to browse through all of the information that was presented to them during the experimental process, but they could not revise any answers once they had submitted them.

### 4.2 Questionnaire design

There were three main parts: demographic data on the subjects in Questionnaire 1; cognitive measures on perceived mechanism risk and trust in the initiator, and intention to bid in Questionnaire 2; and a request for subjects to explain the reasons for the decisions that they made

during the experiment in Questionnaire 3. All items in the cognition measurement portion of the questionnaire were specified on a 7-point Likert scale. ‘7’ was ‘strongly agree,’ ‘4’ was ‘neutral,’ and ‘1’ was ‘strongly disagree.’ We used responses about the subjects’ perceived financial risk and perceived psychological risk to understand their perceptions about economic and psychological cost of bidding in group-buying auctions. The items that we used were adapted from Stone and Gronhaug [60]. Perceived trust in the auction initiator measures the subjects’ trust. Some questionnaire items about perceived trust were adapted from Gefen et al. [21] and Ba and Pavlou [6]. We used the subjects’ anticipated intentions to investigate their willingness-to-bid for the sale item. Our questionnaire was revised based on Gupta et al. [28] and Spears and Singh [57]. See “Appendix C” for the questionnaire items.

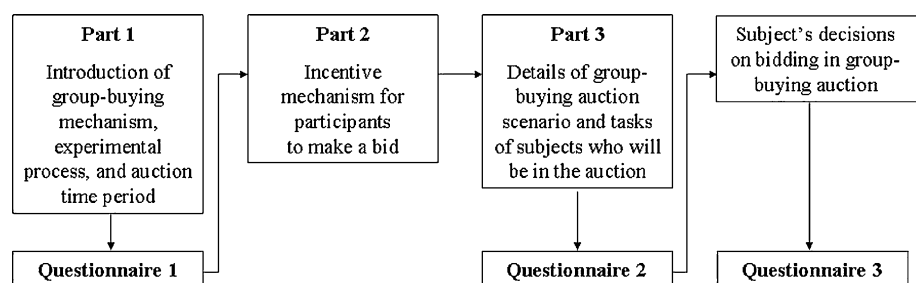
### 4.3 Analysis

#### 4.3.1 Validity and reliability

We conducted a *confirmatory factor analysis* test for validity and reliability of our preconceived theory model and used the AMOS 6.0 software ([www.spss.com/amos](http://www.spss.com/amos)) for this analysis work in this research. We used a maximum likelihood estimation approach for the analysis. Jöreskog [32] points out several advantages of this approach. First, it enables the model to be explained in terms of latent constructs or observed variables, and no power is lost for either case. Second, the evaluation of convergent and discriminant validity can be made at both the matrix and individual parameter levels. Third, the hypotheses related to convergent and discriminant validity can be tested statistically by a series of hierarchically nested models. Fourth, the method provides separate estimates of variance [8].

Path analysis is a general set of procedures that are used to estimate the directed dependencies among a set of variables with factor analysis, discriminant analysis, and other means. It can also be thought of as a special case of structural equation modeling (SEM). Path analysis in SEM,

**Fig. 3** Three-part experimental process and questionnaire administration sequence



however, only employs single indicators for each variable in the causal model. In addition, path analysis in SEM is implemented with a structural model, but without a measurement model. IS researchers often apply SEM with partial least squares (PLS) tools, which only use principal factor analysis with a predefined set of axes, and equate it with path analysis. This is not valid though, because PLS does not produce path analysis results. Instead, only AMOS, which is based on Jöreskog's algorithms, will. So our usage of AMOS is more appropriate.

We retained questionnaire items with a standardized loading higher than 0.5 for further analysis [29]. AMOS also produced readings on *convergent validity*. We found that all values for the variance extracted were above 0.5 (0.66 for perceived financial risk; 0.84 for perceived psychological risk; 0.86 for perceived trust in initiator; and 0.92 for intention to bid), and greater than the *inter-construct squared correlation estimates* (0.05 between perceived financial risk and perceived psychological risk; 0.06 between perceived financial risk and trust in initiator; 0.23 between perceived financial risk and intention; 0.01 between perceived psychological risk and trust in initiator; 0.01 between perceived psychological risk and intention; and 0.29 between trust in initiator and intention). So there is convergence and no problem with discriminant validity [29]. The *construct reliability* measures also were all greater than 0.6 (0.94 for perceived financial risk; 0.69 for perceived psychological risk; 0.69 for perceived trust in initiator; 0.74 and for intention to bid). The validity values of the measurement model ( $\chi^2/df = 2.02$ ; GFI = 0.99; NFI = 0.99; CFI = 0.99; RMSEA = 0.03) were all better than the recommended values ( $\chi^2/df < 3.0$ ; GFI, NFI, CFI > 0.9; RMSEA < 0.1). So the model fits well.

Before we tested our hypotheses, we checked to see if there were potential variables outside our control that might bias the results. For example, whether our subjects have experience in group-buying auctions and in online shopping are two possible variables that are outside our experimental control. They may change the information processing that subjects engage in. They may also affect how subjects perceive the risks and trust in the auction initiator. We conducted a multiple analysis of covariance (MANCOVA) test. This involved using the subjects' *online shopping experience* (whether they had prior experience with shopping online) and *group-buying auction experience* (whether they had experience with bidding in a group-buying auction) as two covariates. The MANCOVA test indicated no significant main effects for online shopping experience (Wilks's  $\Lambda = 1$ ,  $F = 0.59$ ,  $p = 0.62$ ) or for group-buying auction experience (Wilks's  $\Lambda = 1$ ,  $F = 0.37$ ,  $p = 0.37$ ). Therefore, we determined that we did not need to consider control variables of this nature in the following hypothesis tests.

#### 4.3.2 Effects of textual comments and existing bids

Next, we seek to understand two things. One is the effects of textual comments and the number of existing bids on consumers' perceived risk of bidding. The other is the perceived trust the consumer will have in the auction initiator. Regarding our experimental research design, we wish to identify whether changes in the independent variables have a significant effect on the dependent variables, along with identifying interactions among the independent variables and the association among dependent variables. A *multivariate analysis of variance* (MANOVA) test is the most informative way to analyze this set of variables, when there are no latent variables. Though a structural equation modeling (SEM) test which depicts all of the relationships among constructs in the analysis is widely used in IS research, this method is not suitable for our experimental research design. This is because our independent variables are all experimental manipulations; they are not unobservable constructs or latent factors as may be the case in other research.<sup>5</sup>

We first ran *Box's M test for homogeneity of variance-covariance matrices* [42] as a means of determining whether the covariances were the same for all of the categories for the variables of interest. The result of Box's *M* test was 41.28 ( $F = 1.37$ , signif. = 0.09). *Levene's univariate test* produced an  $F = 0.66$  (signif. = 0.65) for perceived financial risk, an  $F = 0.81$  (signif. = 0.55) for psychological risk, and an  $F = 1.31$  (signif. = 0.26) for trust in initiator. Though the values for the multivariate test were significant at the level of  $p < 0.1$ , the violation of this assumption has only minimal impact, because all of the groups were approximately of equal size. We know this from the value of the largest group size divided by the smallest group size, which is less than 1.5 [29]. Our MANOVA results also suggest that textual comments and the number of existing bids have significant main effects. Following the MANOVA test, we also conducted an *analysis of variance* (ANOVA) test to examine the effect of textual comments and existing bids separately. The related MANOVA and ANOVA test results are summarized in Table 2.

The results show that both textual comments and existing bids have a significant effect on consumers' perceived financial risk and their trust in the auction initiator. Both of them, at the same time, do not significantly affect

<sup>5</sup> We see similar treatment of these issues in research that is published in some of the top consumer behavior and marketing journals (e.g., the *Journal of Consumer Research* and the *Journal of Marketing Research*). They also usually use MANOVA and ANOVA as the main analysis methodologies due to the experimental research designs that they implement, and rarely use SEM. The interested reader should see some of the following articles as examples: Andrade and Iyer [2], Fitzsimons et al. [19], Gorn et al. [25], Griskevicius et al. [27], Labroo et al. [41], Li [46], Srivastava and Chakravarti [59], Thomas and Morwitz [61] and Zauberger et al. [64].

**Table 2** Analysis of variance tests

Independent variable	Wilk's $\Lambda$	$F$	Signif.	
<b>Multivariate test (MANOVA)</b>				
<i>Textual Comments</i>	0.99	2.49	0.02**	
<i>Number of Existing Bids</i>	0.99	4.01	0.01**	
Dependent variable	$df$	Sum of squares	$F$	Signif.
<b>Univariate test (ANOVA)</b>				
Source: <i>Textual Comments</i>				
<i>Financial Risk</i>	2	10.55	4.44	0.01**
<i>Psychological Risk</i>	2	0.1	0.03	0.97
<i>Trust in Auction Initiator</i>	2	5.42	3.39	0.03**
Source: <i>Number of Existing Bids</i>				
<i>Financial Risk</i>	1	4.37	3.68	0.06*
<i>Psychological Risk</i>	1	3.21	2.03	0.15
<i>Trust in Auction Initiator</i>	1	6.64	8.29	0.00***

We also examined the moderating effect between textual comments and the number of existing bids that were made. The results did not indicate significance of this effect (Wilk's  $\Lambda = 1$ ,  $F = 0.4$ , signif. = 0.88). Thus, textual comments and existing bids appear to independently affect the subjects' perceived trust in the initiator and their perception of financial risk

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

consumers' perceived psychological risk. To examine the direction of the effect of the independent variables, we compared the means of the dependent variables between groups. The means of perceived financial risk and trust in the initiator relative to textual comments are shown in Table 3. It presents the post hoc mean difference test results on the effects of textual comments on perceived financial risk and trust in initiator. The test shows that consumers perceived the highest trust in the initiator and the lowest risk for participating in a group-buying auction when the textual comments were all positive. Table 3 indicates that additional negative textual comments increased risk and reduced trust.

The following hypotheses were supported: the Negative Effects of Positive Textual Comments on Perceived Risks Hypothesis (H1a, but only for financial risk), and the Positive Effects of Negative Comments on Perceived Risks Hypothesis (H1b, also only for financial risk), the Positive Effects of Positive Textual Comments on Auction Initiator Trust Hypothesis (H2a), and the Negative Effects of Negative Textual Comments on Auction Initiator Trust Hypothesis (H2b). We did not find a significant difference between the impact of an additional single major and several additional minor negative comments on perceived risk and trust in initiator though. Thus, our Effects of Major

**Table 3** Post hoc mean differences for effects of textual comments on financial risk and trust

Groups	Mean	SD		
<b>Means of perceived risks/trust: <i>Textual Comments</i></b>				
Dependent variable: <i>Financial Risk</i>				
All positive comments	4.04	1.07		
Positive comments plus several minor negative ones	4.23	1.14		
Positive comments plus a single major negative one	4.28	1.10		
Dependent variable: <i>Trust in Auction Initiator</i>				
All positive comments	4.67	0.87		
Positive comments plus several minor negative ones	4.51	0.96		
Positive comments plus a single major negative one	4.64	0.86		
Groups ( $i$ )	Groups ( $j$ )	Mean Diff. ( $i - j$ )	SD	Signif.
<b>Post hoc mean difference test</b>				
Dependent variable: <i>Financial Risk</i>				
All positive comments	Positive comments plus several minor negative ones	-0.19	0.08	0.08**
	Positive comments plus a single major negative one	-0.24	0.08	0.02**
Positive comments plus several minor negative ones	Positive comments plus a single major negative one	-0.05	0.08	0.81
Dependent variable: <i>Trust in Auction Initiator</i>				
All positive comments	Positive comments plus several minor negative ones	-0.17	0.07	0.05**
	Positive comments plus a single major negative one	-0.03	0.07	0.88
Positive comments plus several minor negative ones	Positive comments plus a single major negative one	-0.13	0.07	0.14

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; Scheffe test for comparisons

**Table 4** ANOVA test for the effects of existing bids

Groups	Mean	SD				
Means of perceived risk/trust: <i>Existing Bids</i>						
Dependent variable: <i>Financial Risk</i>						
Low	4.25	1.10				
High	4.12	1.08				
Dependent variable: <i>Trust in Auction Initiator</i>						
Low	4.52	0.92				
High	4.68	0.87				
		Sum of squares	<i>df</i>	Mean squared error	<i>F</i>	Signif.
ANOVA test						
Dependent variable: <i>Financial Risk</i>						
Between group	4.55	1	4.55	3.81	0.05**	
Within group	1,250.07	1,046	1.20			
Total	1,254.62	1,047				
Dependent variable: <i>Trust in Auction Initiator</i>						
Between group	6.78	1	6.77	8.43	0.00***	
Within group	839.38	1,046	0.80			
Total	846.15	1,047				

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

**Table 5** Regression model results: intention to bid, and perceived risks and trust

Independent variable	<i>B</i>	SE	$\beta$	Signif.	Collinearity	
					Tolerance	VIF
Constant	3.14	0.22				
<i>Financial Risk</i>	-0.32	0.03	-0.29	0.00***	0.92	1.08
<i>Psychological Risk</i>	0.10	0.02	0.10	0.00***	0.95	1.05
<i>Trust in Auction Initiator</i>	0.58	0.03	0.44	0.00***	0.96	1.04

Dep. var. = Intention to Bid; *B* = regression coef.;  $\beta$  = standardized regression coef.; *F* = 170.9; Signif. = 0.00;  $R^2 = 0.33$ ; adj.- $R^2 = 0.33$ ; Signif.: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

and Minor Negative Textual Comments on Perceived Risks Hypothesis (H1c) and Effects of Major and Minor Negative Textual Comments on Auction Initiator Trust Hypothesis (H2c) do not seem to be supported.

Regarding the effect of existing bids, we implemented an ANOVA test because there were only two groups. Its purpose was to examine the direction of the differences in perceived financial risk and trust in initiator. See Table 4. The results show that the larger number of existing bids led to lower perceived financial risk and higher perceived trust in the initiator, supporting the Effects of Existing Bids on Perceived Risks Hypothesis (H3a, but only for financial risk) and Existing Bids' Effects on Perceived Trust in Auction Initiator Hypothesis (H3b).

#### 4.3.3 Intention to bid

We conducted a multiple regression analysis to test whether consumers' perceived risks of participating in a group-buying auction and their perceived trust in the initiator affect their intention to bid. While a structural equation modeling (SEM) test serves purposes that are similar to multiple regression, we decided to use multiple regression since the relationship we are going to test is simple and easily examined. Table 5 indicates that perceived financial risk, perceived psychological risk, and trust in the initiator all significantly influence consumer intentions to bid. It also reveals that the effect of perceived financial risk is negative, while the effect of trust in the initiator is positive and bigger than the effect of perceived financial risk. However, the effect of perceived psychological risk is positive, which does not support our hypothesis. The multiple regression analysis provides support for the Perceived Risks Effects on Group-Buying Auction Participation Hypothesis (H4, but only for financial risk) and for the Effects of Auction Initiator Trust on Group-Buying Auction Participation (H5).

#### 4.3.4 Additional attempts and information

In addition to our current research model, we evaluated other causal-effect models based on previous studies. First,



**Table 6** Summary of hypothesis results

#	Hypotheses	Results
<i>The effects of textual comments on perceived risks hypotheses</i>		
1a	Negative effects of positive textual comments on perceived risks	Partially supported
1b	Positive effects of negative textual comments on perceived risks	Partially supported
1c	Effects of major and minor negative textual comments on perceived risks	Not supported
<i>Textual comments effects on initiator trust hypotheses</i>		
2a	Positive effects of positive textual comments on auction initiator trust	Supported
2b	Negative effects of negative textual comments on auction initiator trust	Supported
2c	Effects of major and minor negative comments on auction initiator trust	Not supported
<i>Existing bids' effects hypotheses</i>		
3a	Effects of existing bids on perceived risks	Partially supported
3b	Effects of existing bids on perceived trust in the auction initiator	Supported
<i>Other hypotheses</i>		
4	Effects of perceived risks on group-buying auction participation	Partially supported
5	Effects of auction initiator trust on group-buying auction participation	Supported

we broke the construct trust in initiator into three sub-variables: the initiator's ability, integrity, and benevolence. We then used them in our MANOVA, ANOVA, and multiple regression analysis work. Second, we introduced the idea of second-order factors into our analysis. We adopted perceived financial risk, perceived psychological risk, and the initiator's ability, integrity, and benevolence as first-order constructs to form two-second-order constructs: perceived risk and perceived trust. However, not enough information came out of the experiment setting, based on our analysis, to support our attempts to deliver additional empirical results.

In our experimental design, we asked our subjects to explain the reasons for the bidding decisions they made during the process. They could either state several reasons or just one reason. There were 788 subjects who decided to put in bids in the group-buying auction; another 260 chose not to do so. The experimental subjects reported a number of different reasons for bidding. Altogether, 462 of them indicated that 'A lot people will bid in the future.' Another 359 of them stated that 'There were positive comments.' Still another 251 of them responded that 'I expect the final price will be fairly low.' And finally 215 of them noted that 'Overall, the auction initiator is trustworthy.' Our subjects expressed other reasons for why they decided not to put in bids. For example, 150 of them indicated: 'I expect the final price will not be that low.' Another 131 of them indicated that 'The comments are negative.' A further 114 of them suggested that 'There will not be enough bids in the future.' And finally 45 of them stated that 'Overall, the auction initiator is not trustworthy.' Those numbers all support our hypotheses that consumers will be more confident to make bids in a group-buying auction when there is less perceived risk and higher trust.

## 5 Discussion

The results confirm most but not all of our hypotheses. First, positive comments diminished consumers' perceived financial risk, and had a positive effect on perceived trust in the auction initiator. Negative comments increased perceived financial risk, but diminished perceived trust in the auction initiator. For both perceived risks and trusts in the auction initiator, there was no difference between the effect of a single major negative comment and several additional minor negative ones though. Second, existing bids had a significant impact on perceived financial risk and trust in the auction initiator. When there were more existing bids, consumers perceived more trust and less risk. As the number of participants increased, consumers became more comfortable to make group-buying auction bids. Third, the perceived financial risk of participating in a group-buying auction and the perceived trust in the auction initiator impacted consumers' intentions to bid. Perceived financial risk had a negative impact while perceived trust had a positive impact. See Table 6.

Positive textual comments, based on our results, lead to higher perceived trust in the auction initiator and lower perceived financial risk. They seem to strengthen consumer confidence and convince them that a group-buying auction is a safe environment in which to make a purchase. In contrast, negative textual comments signal threats. Our results suggest that group-buying auction initiators need to build and maintain good reputations. From Ba and Pavlou [6], we know that if buyers are unable to identify their transaction partners, they are not going to trade. So with initiators of group-buying auctions, a key role they will play is to convince consumers to bid.

An additional major negative textual comment, in our results, seems not to have a consistent effect on consumers' perceived financial risk and trust in initiator. It has increased the perceived financial risk but has not decreased the perceived trust in initiator. Interestingly though, several additional minor negative textual comments did just that: they increased perceived financial risk and decreased perceived trust in initiator. Although a major negative textual comment is generally worse than a minor negative textual comment, an additional single major negative textual comment, given that all the others are positive, appears to be an exception in terms of how consumers process this kind of information. They apparently did not place much weight on it. One experimental subject told us: "One negative textual comment will be suspicious and may not be trustworthy." However, several additional minor negative textual comments may get more attention from a consumer—to the point of achieving a *critical mass perception of potential problems*—than an additional single major negative textual comment. Consumers, we believe, should consider both the amount and content of textual comments in their purchasing decisions. They probably do not make judgments based just on rating scores. Instead, they would like to know more about the details. Thus, we conclude that researchers should not only look at the effect of the rating scores for reputation mechanisms, since this only gives a limited amount of information to consumers.

The results of the experiment suggested to us that the textual comments and the number of existing bids from consumers who have been participants in an online group-buying auction appeared to not have significantly affected consumers' perceived psychological risk. There are several possible reasons for this. First, our study focused on subjects' potential psychological risk when there was a possibility that there would not be enough bids to make a group-buying auction successfully conclude. So our experimental subjects might not have reacted appropriately. Second, the lack of a positive result may be due to the number of bid levels and number of bids in each level that we chose for our experiment—in other words, an artifact of our experimental design choices. What we assigned may not have offered "large enough" perceptual differences, in the sense of Weber's Law that a change in a stimulus that will be just noticeable is a constant ratio of the original stimulus. So, as a result, whether there would be enough bids at the end of an auction may not have been a concern for our experimental subjects. So they may not have perceived psychological risk in making bids in the group-buying auction in the manner that we initially envisioned.

There are three aspects of our theoretical model that deserve some additional comments. First, in this study, we built textual comments into our experimental design as an independent variable. Regarding consumer trust and risk

perceptions, in this study, we built textual comments into our experimental design as an independent variable. Reputation systems have been used as a means of reducing perceived risks and increasing consumer trust in online shopping environments. Rating scores provide consumers with quantitative information, while textual comments give them qualitative information. Compared to rating scores, textual comments offer more detailed information and help consumers to make more precise judgments. However, only a few studies have focused on the importance of textual comments and none of them have been conducted in the group-buying context, where trust and risk issues are more critical than in regular online shopping. Our research model, in contrast to most other works, reflects the fact that consumers consider both qualitative and quantitative data from online reputation systems.

Second, this study is the first one to experimentally test for network effects in the context of online group-buying. Though we previously noted that a positive network effect will encourage consumers to join the auction, and increase their intention to buy, this has never been experimentally tested in a group-buying auction setting. When more participants lodge their bids, other consumers will feel more confident to bid. Third, compared to other online transaction methods, group-buying auction consumers face more price and psychological uncertainties than other consumers. By including two types of risk considerations, our theoretical model enabled us to closely scrutinize consumer risk perceptions. The results of the present study, we believe, offer new knowledge for understanding consumer behavior in online shopping research.

Furthermore, our research on group-buying on the Internet provides the capability to do what Merton [52] and Gregor [24] have called *middle range theory* development. This approach enables researchers to focus on a specific phenomenon through a combination of theory and empirical research, moving away from more broad-based empiricism that may be difficult to implement [55]. Kauffman and Tsai [38], Kauffman et al. [37] and Levine and Rossmore [45] offer several examples of this style of research in different research contexts. Our exploration of theory, though it is achieved through an experimental research design here, has been to understand some of the specific elements of how an initiator engenders trust in a risky group-buying auction setting with a specific product, mechanism design and other characteristics.

For anyone who manages an online group-buying auction marketplace, this research will be helpful for them to understand the multiple ways in which trust and risk are likely to be critical determinants, though clearly not the only determinants of success. Like other online transaction intermediaries, a group-buying initiator must maintain a good reputation. This way, consumers will have the

confidence to bid in an auction. Thus, it is in the interest of the intermediary to provide meaningful support for auction initiators through a set of dedicated services and ongoing facilitation. This will ensure that the initiator is perceived as trustworthy and capable, able to successfully recruit auction participants and to become a successful auction closer. Unlike other kinds of online auctions, when a group-buying auction fails to achieve critical mass, this will inevitably cause a death spiral of declining bidding and diminished mechanism viability. So group-buying auction intermediaries would serve their own best interests by offering auction participation incentives and promotions to engender bidder participation.

## 6 Conclusion

Trust and risk are continuing concerns of consumers in online shopping. Compared with other kinds of online auctions, online group-buying auctions create more uncertainty and risk for consumers. The role of the auction initiator in group-buying also brings with it issues of trust. Although initiators are most often sellers or a third-party intermediary, in the setting that we have studied a consumer initiates the group-buying auction [11, 53]. Trust in the initiator is a concern that influences consumer bidding. Textual comments are a useful form of feedback. They give consumers information to evaluate how well they can trust the auction initiator and the degree of risk they face during the auction. They give consumers more information than ratings do. Moreover, there has been much research on ratings for auction and e-marketplace participants, but much less attention has been given to the contents of textual comments from them.

We also have noted that the number of existing bids in an online group-buying auction provides additional meaningful information for consumers. We posited that there is a network effect associated with a critical mass in existing bids in group-buying auctions. This also enables consumers to calibrate the risks they face. It further shows the confidence that others are willing to express in the capability of the group-buying auction initiator to achieve a successful outcome with the auction and the higher possibility of reaching lower price.

Using an experimental design, we found that positive textual comments tended to enhance consumers' perceived trust in the auction initiator and decrease the financial risk they perceived in online group-buying auctions. Negative textual comments appeared to be associated with the opposite effects. With all positive comments, another major negative comment seems to have little or no effect on perceived trust in the initiator. Yet several additional minor negative comments appear to have increased

perceived financial risk and decreased perceived trust in the auction initiator. So the ratings seem like they are not the only source that consumers use to evaluate risk in this form of online auctions. Meanwhile, more existing bids tend to give consumers the confidence to participate. This, we argue, will lead to more bids, and higher liquidity for the products that are sold via group-buying auctions.

There are limitations in this research. First, we do not know the extent to which the products used in our experiments influence the *generalizability* of our findings. Second, we used “stars” in our experimental design to enforce subjects' perceptions of positive, minor negative, and major negative comments. However, there is a potential for them to make different judgments about what the number of stars on textual comments may mean. We did not obtain evidence from our experiment to indicate that subjects perceive positive and negative comments though. Third, it is possible that an inactive seller will have more than one major negative comment in a real-world online marketplace. Fourth, the data were collected using an experimental method, not a *field study*. Though we attempted to imitate a real marketplace, there still is the issue of *external validity*. In addition, the experimental nature of this study itself may affect the characteristics of the respondents, who may not perfectly represent real-world consumers, even though they possess similar demographics and observed high-level behaviors. As a result, it is natural for us to think about ways to take this research forward, so as to provide a basis for even deeper insights to emerge.

To overcome the *realism* issues associated with the experimental research design that we have discussed [56], it may be appropriate for us to shift to the collection of repository data on real-world group-buying auctions and selling environment transactions that are made on the Internet. In such contexts, it will be possible for us to gain a better understanding of the extent to which some of the specific design elements that are chosen by real-world group-buying auction operators play out in practice. Although we recognize that we will lose experimental *control* in this manner, and precision in assessment may not be possible, nevertheless conducting field research—or even single-site empirical case study research—will give us additional degrees of freedom to explore the phenomenon of online group-buying auctions in as natural and realistic a setting as possible. This will permit us to move from experimental methods to very large-scale data collection with empirical models that are based on the relevant theory with data analysis via econometrics and inventive statistical analysis.

**Acknowledgments** An earlier version of this article was presented at the 2009 Hawaii International Conference on Systems Science,

where it was nominated for a best paper award. We thank the co-chairs of the Electronic Marketing Mini-Track, Ajit Kambil, Arnold Kamis, Marios Koufaris and Bruce Weinberg, and three anonymous reviewers for helpful comments. We also benefited from input from Jian Chen, Zhangxi Lin, Erik Rolland, Chris Westland, Bin Wang, Juliana Tsai, YenChun Chou, David Weber, Ting Li, Paul Steinbart, Julie Smith-David, Angsana Techatassanasoontorn, and the participants of the 2007 Symposium on Electronic Commerce in China, held at the Carlson School of Management of the University of Minnesota in August 2007. Rob Kauffman acknowledges the W. P. Carey Chair, the Center for Advancing Business through Information Technology at the W. P. Carey School of Business, National Sun Yat-Sen

University, and the Shidler School of Business at the University of Hawaii for generous support. Hsiangchu Lai's research was partially supported by the "Aim for the Top University Plan" of National Sun Yat-sen University and the Ministry of Education, Taiwan, Republic of China. All errors are the sole responsibility of the authors.

### 7 Appendix A: Group-buying auction sites in Taiwan and the US, 2010

See Figs. 4, 5, 6, 7 and 8.

**Fig. 4** iHergo  
(www.ihergo.com) in Taiwan  
(as of February 3, 2010)

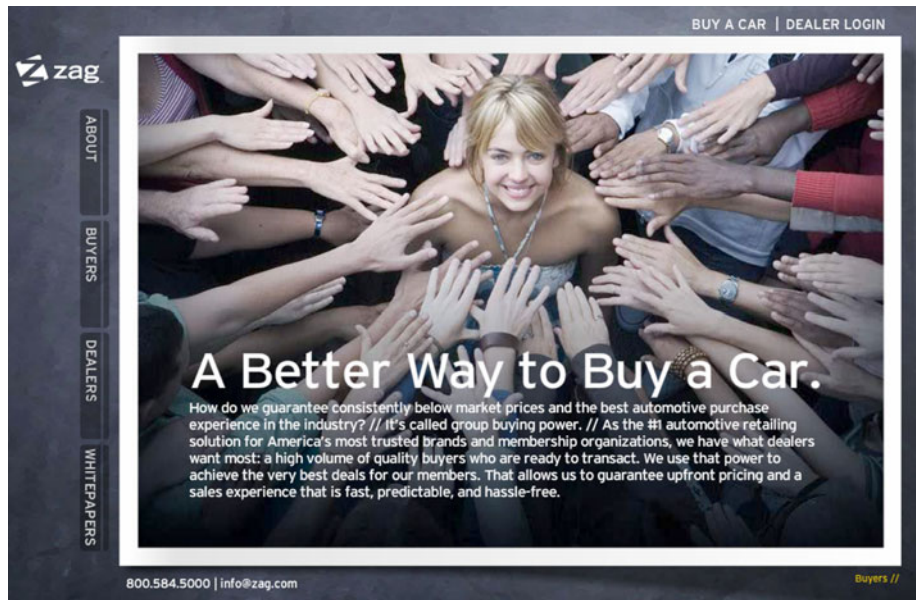


**Fig. 5** DinBenDon!  
(www.dinbendon.net) in Taiwan  
(as of February 3, 2010)





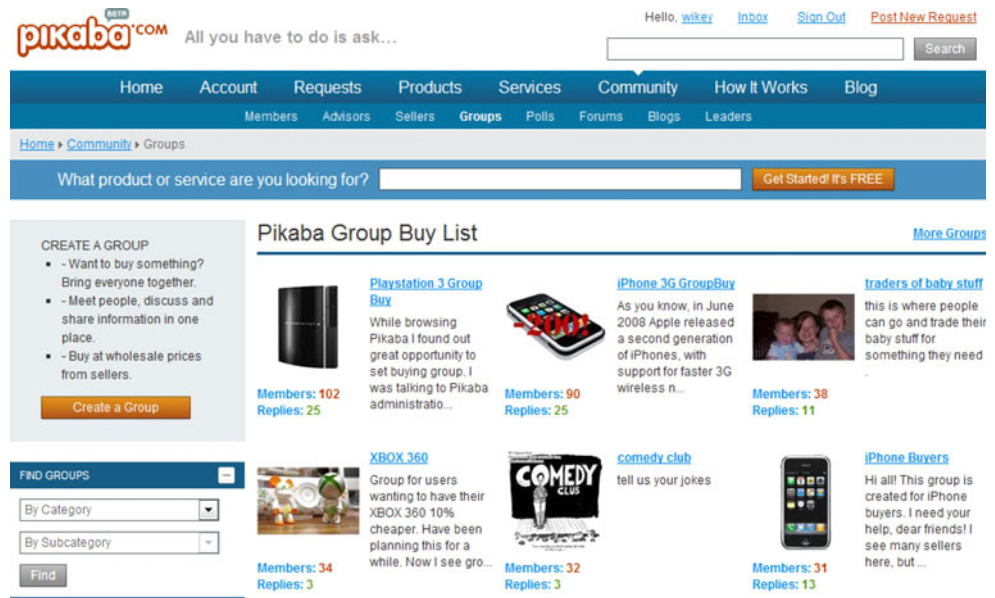
**Fig. 6** Zag ([www.zag.com](http://www.zag.com)) in the US (as of February 3, 2010)



**Fig. 7** Groupon ([www.groupon.com](http://www.groupon.com)) in the US (as of February 3, 2010)



**Fig. 8** Pikaba ([www.pikaba.com](http://www.pikaba.com)) in the US (as of February 3, 2010)



**8 Appendix B: The design of the experiment**

See Tables 7, 8, 9, 10, 11, 12 and Fig. 9.

**Table 7** Pretest scores for positive, minor negative, and major negative textual comments

Comments	Average test score	Comments	Average test score
Positive 1	2.95	Positive 8	3.59
Positive 2	3.23	Positive 9	3.50
Positive 3	3.55	Positive 10	3.95
Positive 4	3.50	Minor negative 1	6.91
Positive 5	2.86	Minor negative 2	5.77
Positive 6	3.95	Minor negative 3	6.86
Positive 7	3.59	Major negative 1	8.05

**Table 8** The manipulation of the price curve

Number of bidders	Price in NT\$
1–5	1,700
6–10	1,600
11–15	1,510
15–20	1,430
>21	1,360

US\$1 = NT\$30

**Table 9** The manipulation of the number of existing bids

Number of existing bids	Number of bidders
Low	1–5
High	11–15

**Table 10** The manipulation of the number of textual comments

Textual comments	Number of positive comments	Number of negative comments	
		Minor	Major
All positive comments	10	0	0
Positive comments plus several minor negative ones	10	3	0
Positive comments plus a single major negative one	10	0	1

**Table 11** The research design

Number of subjects	Number of existing bids		
	Low	High	Total
Textual comments			
All positive comments	166	178	334
Positive comments plus several minor negative ones	178	179	357
Positive comments plus a single major negative one	173	174	347
Total	517	532	1,048

**Table 12** Descriptive statistics of the experimental subjects

Attributes	Number of subjects	Percent of total
<b>Gender</b>		
Male	471	44.9
Female	577	55.1
<b>Age</b>		
Less than 20 years old	141	13.5
21 to 30 years old	800	76.3
Higher than 31 years old	107	10.2
<b>Profession</b>		
Student	701	66.9
Working	347	33.1
<b>Education</b>		
High school or less	25	2.4
Undergraduate	766	73.1
Graduate or above	257	24.5
<b>Income</b>		
Less than NT\$20,000	764	72.9
NT\$20,001 to NT\$40,000	164	15.6
Higher than NT\$40,001	120	11.5



**Fig. 9** The consumer purchase strategy for a 128 MB iDog in a group-buying auction. *Note:* This screenshot of the group-buying experimental test bed includes the original list price of the iDog at NT \$1,800. It also shows the complete group-buying price curve for 1–5 bids at NT\$1,700 for each item all the way down to 21 or more bids at NT\$1,360 for each item. Item prices are inclusive of shipping fees, and the auction was open between April 30 and May 9, about ten

days. The lower-middle buttons permit the consumer to: make a bid immediately (購買); think some more about participating (再考慮看看); and, to decline to bid (放棄購買). The opportunity for a consumer to decline to bid in an auction is an important feature of this experimental test bed that makes it more like the real world. *Source:* Electronic Commerce and Negotiation Support Systems Group, National Sun Yat-Sen University, Kaohsiung, Taiwan, 2009

## 9 Appendix C

See Table 13.

**Table 13** Summary of measurement items used in the study (in a 7-point Likert-type scale)

Construct	#	Measurement	Factor loading	Variance extracted	Construct reliability	Source
Trust in the auction initiator	1	The initiator will deliver the product I purchase according to the posted delivery terms and conditions	0.85	0.86	0.69	Ba and Pavlou [6], Gefen et al. [21]
	2	The initiator will provide good service	0.86			
	3	The initiator is trustworthy	0.87			
Perceived financial risk	1	If I bid in group-buying auction, I will be concerned that it may not be a wise way to spend my money	0.75	0.66	0.94	Stone and Gronhaug [60]
	2	If I bid in group-buying auction, I will be concerned that I may not get my money's worth	0.56			
Perceived psychological risk	1	If I bid in group-buying auction, I will feel psychologically uncomfortable if there are not enough bids	0.94	0.84	0.69	Stone and Gronhaug [60]
	2	If I bid in group-buying auction, I will have a feeling of anxiety if there are not enough bids	0.74			
Intention to bid	1	I will probably bid in the group-buying auction	0.92	0.92	0.74	Gupta et al. [28], Spears and Singh [57]
	2	I am willing to bid in the group-buying auction	0.94			
	3	I intend to bid in the group-buying auction	0.90			

In our questionnaire design, we developed three to five items for each construct. All these items were displayed as single questions. We asked our subjects to answer all of the questionnaire items during the experiment. We checked the validity of responses only after all subjects finished the whole experimental process. We eliminated subjects who failed to answer all of the questions, and only used responses from the valid samples for data analysis. Following the standard procedure of confirmatory factor analysis (CFA), we applied a convergent validity test to all of the questionnaire items. We only retained questionnaire items with a standardized loading that was higher than 0.5 for the discriminant validity and reliability test. All the measurement items used in this study are reported

## References

- Anand KS, Aron R (2003) Group buying on the web: a comparison of price-discovery mechanisms. *Manage Sci* 49(11):1546–1562
- Andrade E, Iyer G (2009) Planned versus actual betting in sequential gambles. *J Mark Res* 46(3):372–383
- AppleDaily Taiwan. Group-buying of tiramisu: three years hot in PTT (2007) ([1-apple.com.tw/index.cfm?Fuseaction=Article&Art\\_ID=3394089&IssueID=20070414](http://1-apple.com.tw/index.cfm?Fuseaction=Article&Art_ID=3394089&IssueID=20070414))
- Archak N, Ghose A, Ipeirotis P (2007) Show me the money! Deriving the pricing power of product features by mining consumer reviews. In: *Proceedings of the 13th ACM SIGKDD international conference on knowledge discovery and data mining*. San Jose, CA, pp 56–65
- Ajzen I (1991) The theory of planned behavior. *Org Beh Human Dec Proc* 50(2):179–211
- Ba S, Pavlou PA (2002) Evidence of the effect of trust building technology in electronic markets: price premiums and buyer behavior. *MIS Q* 26(3):243–268
- Bhattacharya R, Devinney TM, Pillutla MM (1998) A formal model of trust based on outcomes. *Acad Manag Rev* 23(3):459–472
- Byrne BM (1989) Multiple comparisons and the assumption of equivalent construct validity across groups: methodological and substantive issues. *Multivar Behav Res* 24(4):503–523
- Chang YT (2007) Auctions, group-buying let you select. Shopping on the Internet a great opportunity. *Electronic Commerce Times* (28 May 2007). ([www.ectimes.org.tw/Shownews.aspx?id=9453](http://www.ectimes.org.tw/Shownews.aspx?id=9453))
- Chen J, Chen X, Kauffman RJ, Song X (2009) Should we collude? Analyzing the benefits of bidder cooperation in online group-buying auctions. *Electron Commer Res Appl* 8(4):191–202
- Chen J, Chen X, Song X (2007) Comparison of the group-buying auction and the fixed-pricing mechanism. *Decis Support Syst* 43(2):445–459
- Chen J, Kauffman RJ, Liu Y, Song X (2010) Segmenting uncertain demand in group-buying auctions. *Electron Commer Res Appl* 9(2) (in press)
- Choudhary V, Tomak K, Chaturvedi A (1998) Economic benefits of renting software. *J Org Comput Electron Commer* 8(4):277–305
- Cox DF, Rich SU (1964) Perceived risk and consumer decision-making: the case of the telephone shopping. *J Mark Res* 1(4):32–39
- Dellarocas C (2003) The digitization of word-of-mouth: promise and challenges of online reputation mechanisms. *Manage Sci* 49(10):1407–1424
- DinBenDon.net, Taipei, Taiwan (2008) ([blog.dinbendon.net](http://blog.dinbendon.net))
- Doong HS, Kauffman RJ, Lai HC, Zhuang YT (2009) Empirical design of incentive mechanisms in group-buying auctions: an experimental approach. In: Kauffman RJ, Tallon PP (eds) *Economics, information systems, and electronic commerce: empirical research*, in *Management Information Series*, Zwass V (ed). M. E. Sharpe, Armonk, pp 181–225



18. Economides N (1996) The economics of networks. *Int J Ind Org* 14(2):673–699
19. Fitzsimons GM, Chartrand T, Fitzsimons GJ (2008) Automatic effects of brand exposure on motivated behavior: how Apple makes you “think different”. *J Consum Res* 35(1):21–35
20. Gefen D (2002) Customer loyalty in e-commerce. *J Assoc Info Syst* 3(1):27–51
21. Gefen D, Karahanna E, Straub DW (2003) Trust and TAM in online shopping: an integrated Model. *MIS Q* 27(1):51–90
22. Gelb BD, Sundaram S (2002) Adapting to word of mouse. *Bus Horiz* 45(4):21–25
23. Ghose A, Ipeiritos PG, Sundararajan A (2006) The dimensions of reputation of electronic markets. Working paper. Stern School of Business, New York University, New York (archive.nyu.edu/handle/2451/14757)
24. Gregor G (2006) The nature of theory in information systems. *MIS Q* 30(3):611–642
25. Gorn GJ, Jiang Y, Johar V (2008) Babyfaces, trait inferences, and company evaluations in a public relations crisis. *J Consum Res* 35(1):36–49
26. Greif A (1989) Reputation and coalitions in medieval trade: evidence on the Maghribi traders. *J Econ Hist* 49(4):857–882
27. Griskevicius V, Goldstein NJ, Mortensen CR, Sundie JM, Cialdini RB, Kenrick DT (2009) Fear and loving in Las Vegas: evolution, emotion, and persuasion. *J Market Res* 46(3):384–395
28. Gupta A, Su BC, Walter Z (2004) An empirical study of consumer switching from traditional to electronic channels: a purchase-decision process perspective. *Int J Electron Commer* 8(3):131–161
29. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL (2006) *Multivariate data analysis*, 6th edn. Pearson Education, Upper Saddle River
30. Herr PM, Kardes FR, Kim J (1991) Effects of word-of-mouth and product-attribute information on persuasion: an accessibility-diagnostics perspective. *J Consum Res* 17(4):454–462
31. Jarvenpaa SL, Tractinsky N, Vitale M (2000) Consumer trust in an Internet store. *Inf Technol Manage* 1(1/2):45–71
32. Jöreskog KG (1969) A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika* 34(2):183–202
33. Kambil A, van Heck E (1998) Reengineering the Dutch flower auctions: a framework for analyzing exchange organizations. *Inf Syst Res* 9(1):1–19
34. Kannan PK, Kopalle PK (2001) Dynamic pricing on the Internet: importance and implications for consumer behavior. *Int J Electron Commer* 5(3):63–83
35. Katz M, Shapiro C (1986) Technology adoption in the presence of network externality. *J Polit Econ* 94(4):822–841
36. Katz M, Shapiro C (1994) Systems competition and network effects. *J Econ Perspect* 8(2):93–115
37. Kauffman RJ, Li T, van Heck E (2010) Business network-based value creation in electronic commerce. Working paper. Rotterdam School of Management, Erasmus University, Rotterdam
38. Kauffman RJ, Tsai JY (2009) The unified procurement strategy for enterprise software: a test of the ‘move to the middle’ hypothesis. *J Manage Inf Syst* 26(2):177–204
39. Kauffman RJ, Wang B (2001) New buyers’ arrival under dynamic pricing market microstructure: the case of group-buying discounts on the Internet. *J Manag Inf Syst* 15(2):157–188
40. Kauffman RJ, Wang B (2002) Bid together, buy together: on the efficacy of the group-buying business model in Internet-based selling. In: Lowry PB, Cherrington JO, Watson RR (eds) *Handbook of E-commerce in business and society*. CRC Press, Boca Raton
41. Labroo AA, Dhar R, Schwarz N (2008) Of frog wines and frowning watches: semantic priming, perceptual fluency and brand evaluation. *J Consum Res* 34(6):819–831
42. Layard MWJ (1973) Robust large-sample tests for homogeneity of variances. *J Am Stat Assoc* 68(341):195–198
43. Lee Z, Im I, Lee SJ (2000) The effect of negative buyer feedback on prices in Internet auction markets. In: *Proceedings of 21st international conference on information system*. Brisbane, Queensland, Australia, pp 286–287
44. Leibenstein H (1950) Bandwagon snobs, and Veblen effects in the theory of consumers’ demand. *Q J Econ* 64(2):183–206
45. Levine HG, Rossmoore D (1994) Politics and the function of power in a case study of IT implementation. *J Manage Inf Syst* 11(3):115–133
46. Li X (2008) The effects of appetitive stimuli on out-of-domain consumption impatience. *J Consum Res* 34(5):649–656
47. Liebowitz SJ, Margolis SE (1994) Network externality: an uncommon tragedy. *J Econ Perspect* 8(2):133–150
48. Lim N (2003) Consumers’ perceived risk: sources versus consequences. *Electron Commer Res Appl* 2(3):216–228
49. Mayer RC, Davis JH, Schoorman FD (1995) An integrative model of organizational trust. *Acad Manag Rev* 20(3):709–734
50. McAfee RP, McMillan J (1987) Auctions and bidding. *J Econ Lit* 25(2):699–738
51. Melnik MI, Aim J (2002) Does a seller’s reputation matter? Evidence from eBay auctions. *J Ind Econ* 50(3):337–349
52. Merton RK (1968) *Social theory social structure*. Free Press, New York
53. Michalak T, Tyrowicz J, McBurney P, Wooldridge M (2009) Exogenous coalition formation in the e-marketplace based on geographical proximity. *Electron Commer Res Appl* 8(4):203–223
54. Pavlou PA, Dimoka A (2006) The nature and role of feedback text comments in online marketplaces: implications for trust building, price premiums, and seller differentiation. *Inf Syst Res* 17(4):392–414
55. Pinder CC, Moore LE (eds) (1980) *Middle range theory and the study of organizations*. Martinus Nijhoff Publishing, Hingham
56. Runkel PJ, McGrath JE (1972) *Research on human behavior: a systematic guide to method*. Holt, Rinehart and Winston, New York
57. Spears N, Singh SN (2004) Measuring attitude toward the brand and purchase intentions. *J Curr Issues Advert* 26(2):53–66
58. Spence AM (1973) Job market signaling. *Q J Econ* 87(3):355–374
59. Srivastava J, Chakravarti D (2009) Channel negotiations with information asymmetries: contingent influences of communication and trustworthiness reputations. *J Mark Res* 46(4):557–572
60. Stone RN, Gronhaug K (1993) Perceived risk: further considerations for the marketing discipline. *Eur J Mark* 27(3):39–50
61. Thomas M, Morwitz VG (2009) The ease-of-computation effect: the interplay of meta-cognitive experiences and naïve theories in judgments of price differences. *J Mark Res* 46(1):81–91
62. Tsvetovat M, Sycara K, Chen Y, Ying J (2000) Customer coalitions in the electronic marketplace. In: Sierra C, Gini M, Rosenschein J (eds) *Proceedings of 4th international conference on autonomous agents, Barcelona, Catalonia, Spain*. ACM Press, New York, NY, pp 263–264
63. Williamson OE (1993) Calculativeness, trust, and economic organization. *J Law Econ* 36(1):453–486
64. Zauberman G, Kim BK, Malkoc SA, Bettman JR (2009) Discounting time and time discounting: subjective time perception and intertemporal preferences. *J Mark Res* 46(4):543–556