# A Path Analysis of Online Group Buying:
## Insights From Taiwan

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## ABSTRACT

Online group buying has emerged as a new bargaining power for many shoppers and become more so as a result of the increasingly growing popularity of social networking and community-based web sites. Aside from significant quantity discounts, these buying groups can also potentially influence the manufacturers and retailers on policies, product characteristics, and services. The authors propose an online group buying decision framework to model the overall process of online group buying. They use a major group buying community website in Taiwan, ihergo.com, to test the framework and conduct follow-up analysis. Based on the proposed framework, they design a survey study in an attempt to gain more insights on group buying communities, their activities, and culture within these communities. They then perform a path analysis, a special technique of structural equation modeling (SEM), to study the relationship among the factors used in the survey. The findings provide useful advice for online group buying sites to attract customers and increase sales.

## KEYWORDS

Online Group Buying, Path Analysis, Quantity Discount, Structural Equation Modeling, Survey Study

## 1. INTRODUCTION

E-commerce has emerged since the late 1990's. It continues to grow at a fast pace and becomes the dominant shopping means for most shoppers today. The forms of e-commerce vary, including B2B, B2C, and C2C. Each platform can be further classified into many sub-categories based on the variations of different parameters. Online Group Buying (OGB) is one of such sub-category. It is a mechanism where shoppers of similar products form online communities and use the power of their ordering quantity to negotiate prices with sellers. These groups of shoppers can also potentially influence the manufacturers and retailers on policies, product characteristics, and services. Similar to other e-commerce websites, many OGB sites started in the later part of 1990's, for example, MobShop and Mercata. Many such sites, however, ceased to exist only several years after their inception, due to reasons such as fast expansion (cash burning rate), improper operation, and fierce competitiveness. But they were quickly replaced by many more with modified business operations, mainly because of the sound concept of the fundamental group buying idea.

   The concept of group buying or quantity discount is not at all new to e-Commerce. In fact, many large wholesale stores such as Costco and BJ's operate exactly under this principle. It can also be commonly seen that certain benefits (free shipping, extra peripherals for free, etc.) applied to transactions when the order exceeds a threshold, either in quantity or total dollar amount, on many

popular e-Commerce sites such as Amazon and eBay. Most sellers are eager to sell their products in large bulk in return for a little cheaper price. That is the reason why after many OGB sites closed operation, more similar sites emerged. Also, another key direct benefit that most sellers receive from OGB channels is the comments and feedback provided. Unlike traditional channels where these comments and feedback mostly come from individual buyers, they are now integrated from many consumers and can be viewed as consensus group opinions.

Online group buying remains a relatively under-researched area despite being existed for many years. Many aspects of this phenomenon deserve more investigation. Using a survey study, this research attempts to gain more insights on group buying communities, their activities, and culture within these communities. Specifically, our study is based on a major group buying community web site in Taiwan, i.e. ihergo.com. It is the largest group buying website in Taiwan and has been existed for more than 14 years. As of April 2021, it has more than 1.25 million total registered members. Taiwan's e-Commerce revenues had reached NT\$4.34 trillion ($\approx$ US\$ 144 billion) in 2019 (https://www.statista.com/statistics/956205/taiwan-ecommerce-revenue/). According to a research report by the Institute for Information Industry (http://www.iii.org.tw/), Taiwan's e-Commerce total transaction amount is expected to grow between 10% and 15% annually from 2017-2022. This represents about 4.8% of its overall retailing market. Annual group buying size is about NT\$ 12 billion ($\approx$ US\$ 400 million), which is a small portion of the overall e-commerce. Obviously, there is still much room for consumers to resort to the online venue for their shopping needs in Taiwan. This work sheds lights with businesses on how to seize these market opportunities.

There are plenty of studies on e-commerce existing in the literature. However, studies on online group buying (OGB) are very limited so far. Much of existing OGB literature use the theory of Technology Acceptance Model (TAM) to study factors leading to final group purchases, without looking into how final purchase decisions were reached. In this study, we attempt to bridge this research gap by proposing an online group buying decision framework with buyers' demographics and online features, their internal group communications as well as dispute handling prior to purchase decisions. By using the survey data, we show the descriptive statistics of OGB members and their responses to the questions about the buyers' communication, satisfaction, and dispute handling. Then, we investigate the impacts of buyers' demographics and online parameters on their OGB purchase decision of purchasing amount and frequency. Based on the significant factors associated with their purchase decision, we compare OGB members' differences in their communication, satisfaction, and dispute handling. We discuss the managerial implications from our findings and provide the OGB platform and sellers with our recommendations. These efforts would help grow the OGB marketplace and enhance the efficiency of the market. We believe our contribution to the literature will help future research in more accurately identifying strategies to better capture market opportunities in group buying settings.

## 2. LITERATURE REVIEW

Quantity discount has long been a common business practice. Buyers typically expect a reduction of unit price for bulk order transactions. With the convenience of e-commerce and online communication channels, shoppers either individually purchase multiple quantities of the same item or communicate with each other to form shopping groups to place bulk orders, allowing them to enjoy the price reduction under quantity discount. Hence the emergence of group buying. The pricing of group buying quantity orders is typically a mechanism set by the sellers or as a result of the negotiation process between buyers and sellers.

There is considerable research on pricing policies and quantity discounts. Kohli and Park (1989), while analyzing the transaction efficiency of quantity discount, found that it is a win–win strategy because it's the outcome of cooperation between buyers and sellers. Kauffman and Wang (2001) studied group buying activities in typical e-commerce environments such as B2B and B2C, as well

as a more recent trend of CC2B ("Consumer + Consumer" to Business) structure. Some researchers (Muniz Jr. and O'Guinn, 2001; Schau et al., 2009) argued that online communities where consumers join to enhance their purchasing power actually offer very positive effect for firms because they help brands' value creation.

Some research has focused on the studying of consumers' group buying intentions. For example, Wang et al. (2016) integrated e-commerce success model and the commitment-trust theory to study the stickiness intention of group buying websites. Che et al. (2015), Ku (2012), Li and Shi (2012), and Zhang and Gu (2015) investigated factors leading to the consumers' continuous revisits of OGB websites.

Besides typical e-commerce sites, online auction platforms have also witnessed increasing volume of group buying activities. Anand and Aron (2003) conducted a comparison between online posted-price mechanism and group buying auction mechanism in different scenarios where demand uncertainty and economies of scale exist. They analyzed and provided a guidance to the conditions that favor the group buying auction mechanism. Chen et al. (2002) looked into bidders' behavior in online group-buying auctions. They demonstrated that the mechanism is incentive-compatible for bidders under the assumption of independent private value. They (Chen et al., 2007) also analyzed the stochastic arrival process of bidders in online group buying auctions and developed an approach to determine optimal bidding strategies. In their other paper (Chen et al., 2009), online group buying auction mechanism was shown to be effectively enhanced to produce higher welfare for the auction participants. To achieve this, they suggested that auction intermediary provide a means for bidders to cooperate, resulting in a collectively greater demand. They claimed that such cooperation permits the group buying auction mechanism to dominate the fixed-price mechanism from the seller's point of view under some circumstances. A similar research by Hu et al. (2013) studied the difference between simultaneous and sequential group buying mechanism design and concluded that sequential mechanism resulted in higher deal success rates and larger expected consumer surplus.

The activities of online group buying are not constrained by any specific industry, geographical area, or consumer demographics. In the US, recent successful group buying stories include Groupon, LivingSocial (acquired by Groupon at the end of 2016), and BuyWithMe.com (bought by GILT in winter 2011). Groupon.com alone generated around $3 billion in revenue in 2017. In China, thousands of group buying sites exist. Large ones such as taobao.com, meituan.com, and lashou.com have been successful helping consumers in finding and negotiating good deals.

Technology Acceptance Model (TAM) has been used by many researchers in studying the factors leading to final group purchases (Jeon et al., 2017; Leong et al., 2019; Lim, 2017; Lim, 2020; Sharma and Klein, 2020; Suki and Suki, 2017). However, many of them did not consider the internal group communication prior to the group reaching a final purchase decision nor did they look at possible future repeat purchases.

In this research, we focus on the largest online group buying site in Taiwan, i.e. ihergo.com and use a survey methodology to learn important variables in group buying communities. We first outline an online group buying decision framework. Next, we present the survey design and descriptive analysis of OGB members. We also perform path analyses on the variables used in the survey design to gain more insights on how these variables interact with each other. We then discuss our findings and their managerial implications before providing conclusions for the study.

## 3. ONLINE GROUP BUYING DECISION FRAMEWORK

Online group buying involves group decision making. According to consumer behavior guru Henry Assael (2004), the major difference between individual versus group decision is that the latter requires each group member to play some kind of role in the overall decision making and that any dispute during the process be resolved in a way to optimize the group benefits or minimize the group loss.

In ihergo.com, there are three kinds of roles in any OGB community, i.e., group leader, group buying chief, and group member. Group leader is the one who starts an OGB community; group buying chief is the member who directly communicates/negotiates with the manufacturers or sellers; and group member is just a regular constituency of an OGB community who shares the costs of purchasing any particular product/service of interest among all other members in the same community. Both group leader and group buying chief are by default group members as well. This is the typical structure exists across all known OGB sites.

OGB is a joint decision among multiple constituencies. According to Corfman and Lehman (1987), group decision usually can be reached through one of the following ways:

- Decision is made by dominating minority;
- Decision is made via majority vote;
- Decision is made by unanimity among all members of the group;
- Decision is made by consensus;
- Decision is made by absolute authoritarian;
- Decision is made randomly, so long as the group feels there is an answer.

The subtle distinction among some of the decision processes is explained in detail in their paper. To date, a significant amount of applied OGB research uses the well-established Technology Acceptance Model (TAM) as an underlying theory to study the phenomenon. They include constructs such as perceived usefulness, risks, prices, trust, purchase intention, and actual spending (Jeon et al., 2017; Leong et al., 2019; Lim, 2017; Lim, 2020; Sharma and Klein, 2020; Suki and Suki, 2017). Much of these prior work overlooked the fact that a final purchase decision involves group communication and dispute handling during the decision making process.

In this work, we propose a framework to model the online group buying activities that includes most of the common TAM constructs, while adding the component for group communication and negotiation process, as well as that for the final feedback and satisfaction. It is our view that an appropriate framework should investigate not only how a purchase decision is reached but whether a repeat purchase is feasible based on feedback and satisfaction. Our framework is depicted in Figure 1. As shown, there are three major sub-components in the framework: TAM model, Group Communication and Dispute Handling, and Feedback and Satisfaction.

The TAM model sub-component postulates that community members' demographics and their past and current OGB experiences and activities jointly affect the community demand for certain products and services. During the process of reaching a final purchase decision, possible internal dispute or disagreement may arise. The dispute may in turn affect the demand. The Group Communication and Dispute Handling sub-component of the framework enables the community to resolve the dispute before a final purchase decision is made. In our opinion, this component also involves the negotiation (from group buying chief) with the seller or manufacturer for parameters (e.g. price, quantity, etc.) related to the underlying products or services. The last sub-component, Feedback and Satisfaction, kicks in after a group purchase has been made to examine after-sale satisfaction, possible future refinement to the communication and negotiation process, and other future, similar and/or dissimilar purchases.

Though it is highly desirable to collect as much data as we possibly can to investigate empirically all three components in our proposed framework, we believe a phased approach might be more appropriate. That is, a carefully designed survey that includes all the necessary constructs for the first component will lead to a convincing outcome that in turn can facilitate the data collection and analyses for the subsequent two components. To do this, we carefully design a survey to test the following two hypotheses:

H1: Members' demographics have impacts on their OGB purchase decision.

**Figure 1. Online group buying decision framework**
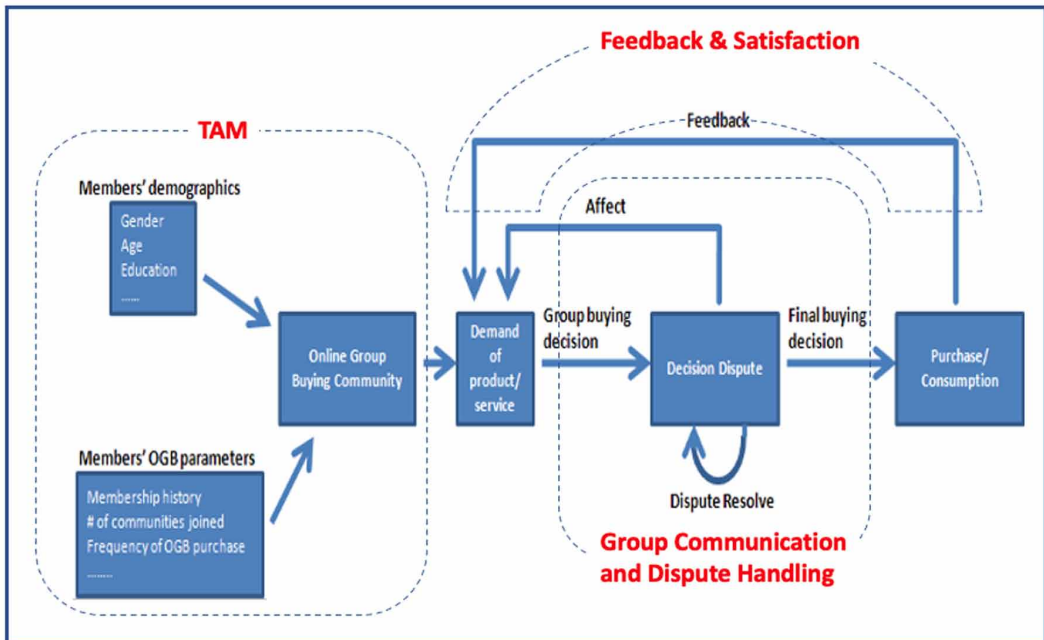


H2: Member's online parameters have impacts on their OGB purchase decision.

Based on the survey data, we present descriptive analysis for all OGB members followed by conducting path analyses on the variables used in the survey to gain more insights on how these variables interact with each other. Due to anonymity concerns as well as the constraints on the length of the survey, we were not able to collect information on group buying chiefs, internal disputes, and feedback and satisfaction in this research. We plan on a follow-up study to gain more data in this regard to connect all the three components proposed in the framework. We do offer some insightful discussions on the Group Communication and Dispute Handling component, and the Feedback and Satisfaction component in the Discussions and Managerial Implications section.

## 4. SURVEY DESIGN AND DATA ANALYSIS

Based on the above proposed Online Group Buying Decision Framework, we designed a survey questionnaire. To recruit our survey participants, we randomly selected 3,000 registrants on ihergo. com to send out our electronic survey. Ihergo is the largest online group buying website in Taiwan. We specifically indicated to the survey recipients that their identities are strictly confidential and that their responses are solely used for academic research purposes. We received a total of 162 responses, representing a response rate of 5.4%. In Table 1, we display demographic information of the survey participants. Since the survey participants are all Taiwanese, the original survey is written in Chinese. A copy of the survey (translated to English) is attached in the Appendix.

### 4.1. Descriptive Statistics

Table 1 shows that female constitute more than 85% of all our respondents. Assuming the response rate does not differ significantly by gender; we can infer that female acts as the major buying power

in online group buying communities. In terms of age, it can be easily seen that 21 - 40 year old range makes up almost 90% of all online buying community members. The education demographic indicates most (97.53%) respondents involve in online group buying at least have high school diploma with nearly 85% having at least community college degree.

From the above observations, businesses that hope to fetch shares of the online group buying market ought to look into what female, young to middle-aged, highly educated online shoppers typically buy. Beside demographics, we also ask survey participants about their activities in online group buying experiences. Table 2 shows a tabulated result of these activities.

Obviously, sharing shopping information and experiences, as well as looking for cheap deals are the main two reasons why shoppers join OGB communities. This calls for OGB sites to design effective and easy-to-use mechanisms for users to communicate. Manufacturers and/or sellers of products/services should find the best ways to disseminate their on sale and discount information for

**Table 1. Demographic information of survey participants**

| Demographics | Frequency (Percentage) | Pie Charts (Percentage) |
|---|---|---|
| **Gender** | Male: 24 (14.8%)<br>Female: 138 (85.2%) |  |
| **Age** | 6-15 years old: 2 (1.23%)<br>16-20 years old: 3 (1.85%)<br>21-25 years old: 31 (19.14%)<br>26-30 years old: 50 (30.86%)<br>31-35 years old: 36 (22.22%)<br>36-40 years old: 27 (16.67%)<br>41-45 years old: 12 (7.41%)<br>46-50 years old: 1 (0.62%)<br>51-55 years old: 0 (0.00%)<br>56-60 years old: 0 (0.00%)<br>61-65 years old: 0 (0.00%)<br>Over 66 years old: 0 (0.00%) |  |
| **Education** | No Education: 0 (0.00%)<br>Elementary: 1 (0.62%)<br>Junior High School: 3 (1.85%)<br>Senior High School: 21 (12.96%)<br>Community College: 46 (28.40%)<br>University: 80 (49.38%)<br>Graduate School or Higher: 11 (6.79%) |  |

Table 2. Activities in or as a Result of group buying experiences

| Description | Frequency |
|---|---|
| **Reasons for joining OGB's (users can select multiple items)** | Sharing shopping information and experiences: 68<br>Looking for similar interests friends: 38<br>Just for fun: 1<br>Reducing product prices: 82<br>Other: 5 (curiosity, looking for kids food, etc.) |
| **Years of membership in ihergo.com** | < ½ years: 50 (30.86%); > ½ years but < 1 year: 54 (33.33%); > 1 year but < 2 years: 42 (25.93%); > 2 years but < 3 years: 9 (5.56%); Can't remember: 7 (4.32%) |
| **Number of communities in ihergo.com joined** | One: 24 (14.81%); Two: 37 (22.84%) ;Three: 26 (16.05%); Four: 20 (12.35%); Five: 24 (14.81%)<br>Not certain: 11 (6.79%); Other: 20 (12.35%) |
| **Roles played** | Group leader (8); Group buying chief (37); Just a group member (143) |
| **Frequency of OGB purchase** | Once a week: 44 (27.16%); Once 2-3 weeks: 35 (21.60%); Once 3-4 weeks: 11 (6.79%); Once a month: 9 (5.56%) Once a quarter: 5 (3.09%); Once every 6 months: 0 (0.00%) ;Once a year: 0 (0.00%); Not certain: 51 (31.48%); Other: 7 (Never) (4.32%) |
| **Average purchasing amount in most recent 6 months in each OGB purchase (converted to US$)** | Under $15: 64 (39.51%) $16 - $30: 29 (17.90%); $31 - $60: 30 (18.52%); $61 - $90: 15 (9.26%); $91 - $120: 13 (8.02%); $121 - $150: 0 (0.00%); $151 - $180: 2 (1.23%); $181 - $210: 0 (0.00%); $211 - $250: 0 (0.00%); $251 - $280: 0 (0.00%); $281 - $310: 0 (0.00%); Over $311: 1 (0.62%); I don't know: 8 (4.94%) |
| **Type of products purchased in the most recent 6 months (users can select multiple items)** | Food: 132; Beauty products: 40; 3C products: 4; Airline tickets: 4; Not certain: 24; Other: 11 |
| **Average percentage saving on each OGB purchase** | 5%: 13 (8.02%); 10%: 23 (14.20%); 15%: 19 (11.73%)<br>20%: 13 (8.02%); 25%: 7 (4.32%); 30%: 4 (2.47%)<br>35%: 1 (0.62%); 40%: 0 (0.00%); 45%: 0 (0.00%); 50%: 1 (0.62%);<br>Not certain: 61 (37.65%); Other: 20 (12.35%) |

existing and potential customers. Those who implement great plans for the above, such as Groupon. com, will tend to be very successful in their businesses.

More than 80% of all respondents joined between one to five OGB communities. The distribution is fairly even. We also see that, as expected, most of the respondents played a role of group members in an OGB community, while some served as the buying chief and few were actually the group leaders. More than 50% of all survey participants engaged in actual purchase of online group shopping at least once every 3-4 weeks. This does not include another 31.5% of those who answered "Not certain" on the purchasing frequency. We suspect that these shoppers purchase even more often since no one selected the least frequent "Once a year" answer, nor did they use the "Other" option to specify the actual frequency.

More than 93% of all purchases in ihergo.com for each member in each online group buying transaction are less than $120 in purchasing amount. This corresponds to the fact that food and beauty products seem to be the most popular items for OGB transactions. Surprisingly, 3C products (computer, communication, and consumer electronics) and airline tickets do not seem to be what most OGB communities are looking to buy. In terms of actual percentage savings from OGB purchases, about 60% (out of those who reported their savings) enjoyed somewhere between 5%-20% discount.

In terms of members' view of important factors, dispute handling, and satisfaction on their OGB experiences, we use a Likert measurement scale from 1 to 5 in the survey. Table 3 shows the sorted

result (from very important to not important all, very agree to very disagree, and very satisfied to very dissatisfied for each scenario).

When asked about important factors affecting the decision of joining OGB communities, group members' personality is ranked number one followed by complimentary gift. Surprisingly, cheap price and product quality are both ranked very low on the list. This might be attributed to the fact that most items bought through OGB are food and beauty product. Since the purchasing price is already low as can be seen from Table 2, members do not view cheap price as an important factor. If the members have decided on a particular brand, than the product quality will be a known variable hence not a concern to them.

For dispute handling, seems like most respondents do not believe in "coordination". Rather, they prefer making own decisions or just yield. This is an interesting discovery and deserves further investigation. When satisfaction is concerned, most people care about how they "feel" in the overall group buying experience more than the actual discount they can get. Again, this can be a result of the type of products purchased and the price of those products.

## 4.2. Path Analysis

To investigate factors leading to the final consumption/sales in OGB transactions, we use path analysis. We are particularly interested in studying the two variables, namely, Freq (how often do shoppers buy products via group buying) and AvgSpending (the average purchasing amount for each group-buying activity in the recent 6 months) since Freq * AvgSpending = Sales. We also identify 11 relevant variables as independent ones and explain both the dependent and independent variables in Table 4.

**Table 3. Ordered list of averaged view on ogb factors, dispute handling, and satisfaction\***

| Importance of OGB Factors (5: Very Important; 1: Not Important at all) | Dispute Handling (5: Very Agree; 1: Very Disagree) | Satisfaction (5: Very Satisfied; 1: Very Dissatisfied) |
|---|---|---|
| 1. Group members' personality (3.01) 2. Complimentary gift (2.98) 3. Self-achievement (2.63) 4. Communication among group members (2.60) 5. The group members' experience (2.58) 6. Product pre-trial or demonstration (2.51) 7. Self-sharing (2.46) 8. The group-buying chief's personality (2.42) 9. Product and brand awareness (2.32) 10. Communication between the group-buying chief and the members (1.98) 11. The communication ability of the group-buying chief (1.96) 12. The group-buying chief's expertise (1.95) 13. Discounts based on purchasing amount (1.93) 14. The group-buying chief's experiences (1.74) 15. Cheap price (1.73) 16. Risks concerned (1.72) 17. Product quality (1.59) | 1. The members should make his/her own decision to solve the problems (4.05) 2. The group-buying chief should yield to solve the problems (4.04) 3. The members should yield themselves to solve the problems (3.96) 4. The group-buying chief should make his/her own decision to solve the problems (3.48) 5. The group-buying chief should compromise to solve the problems (3.04) 6. The members should compromise a way to solve the problems (2.96) 7. The group-buying chief should respect majority opinions to solve the problems (1.99) 8. The members should respect majority opinions to solve the problems (1.83) 9. The members should coordinate a way to solve the problems (1.75) 10. The group-buying chief should coordinate a way to solve the problems (1.59) | 1. Personal feeling (2.49) 2. Self-achievement (2.32) 3. Self-sharing (2.22) 4. The group-buying chief's authority and professionalism (2.15) 5. Expanding interpersonal relationships (2.07) 6. Getting along with other members (2.05) 7. Sharing shopping information and experiences with group members (1.80) 8. Discount concerned (1.74) |

 \* **The average numerical answers from respondents are shown inside parenthesis following each item**

The path models for Freq and AvgSpending are depicted in Figure 2 and Figure 3, respectively, while the coefficient estimates are listed in Table 5.

The path model for Freq shows that variables such as Sharing, Chief, Personality, Gender, Age and AvgSpending are negatively related to Freq. That is, consumers who join ihergo with the sharing purpose, who act as group-buy chief, people who care more about members' personality, male shoppers, older people, and people who spend more per purchase tend to buy less frequently. The path model also shows that the variables such as Time, Leader, Community, Discount, Edu, and Feeling are positively related to Freq. That is, consumers who join ihergo for longer duration, act as community leaders, join more ihergo communities, enjoy more discount saving each time, receive higher education, and who experience high personal feeling in satisfaction tend to buy more frequently.

The second path model shows that variables Edu, Gender, Chief, Freq, and Personality are negatively related to AvgSpending, which means shoppers with higher of these variable values tend to spend less in each purchase. On the other hand, shoppers who are older, join more ihergo communities, enjoy more discount savings each time, join ihergo for longer duration, community leaders, feel high level of personal satisfaction, and who like to share group buying experience tend to spend more in each purchase.

Among coefficients in the Freq path model, two variables, Duration and Edu, are significant at 5% level. For coefficients in the AvgSpending path model, the variable Gender is significant at 5% level. Gender and Education are the two key variables in members' demographics. From the path model, the higher level of education, the more frequent the members conduct OGB. Similarly, the female members are spending more on OGB than male ones. *Therefore, H1 (Hypothesis 1), that is Members' demographics have impacts on their OGB purchase decision is supported with the outcomes of these two variables.* Duration is one variable in Members' OGB parameters. The longer the membership, the more frequent the members conduct OGB. *Therefore, H2 (Hypothesis 2), that is Member's online parameters have impacts on their OGB purchase decision is also supported with the outcome of this variable.* These match the findings from the simple descriptive statistics

**Table 4. Summary of dependent and independent variables**

| # | Variable | Type | Explanation |
|---|----------|------|-------------|
| 1 | Freq | Dependent | Frequency of transactions via group buying |
| 2 | AvgSpending | Dependent | The average purchasing amount for each group-buying activity in the recent 6 months |
| 3 | Duration | Independent | Length of time a participant joined any community/communities of ihergo |
| 4 | Leader | Independent | The role of group leader in a OGB community |
| 5 | Chief | Independent | The role of group-buying chief in a OGB community |
| 6 | Sharing | Independent | Sharing the shopping information and experiences in OGB |
| 7 | Community | Independent | Number of communities one joins in ihergo |
| 8 | Discount | Independent | Average discount saving on each group-buying transaction |
| 9 | Gender | Independent | Gender of the respondent |
| 10 | Age | Independent | Age of the respondent |
| 11 | Edu | Independent | Education level of the respondent |
| 12 | Personality | Independent | Importance of group members' personality |
| 13 | Feeling | Independent | Satisfaction level in personal feeling while participating in group-buying activities |

**Figure 2. Path model for frequency**
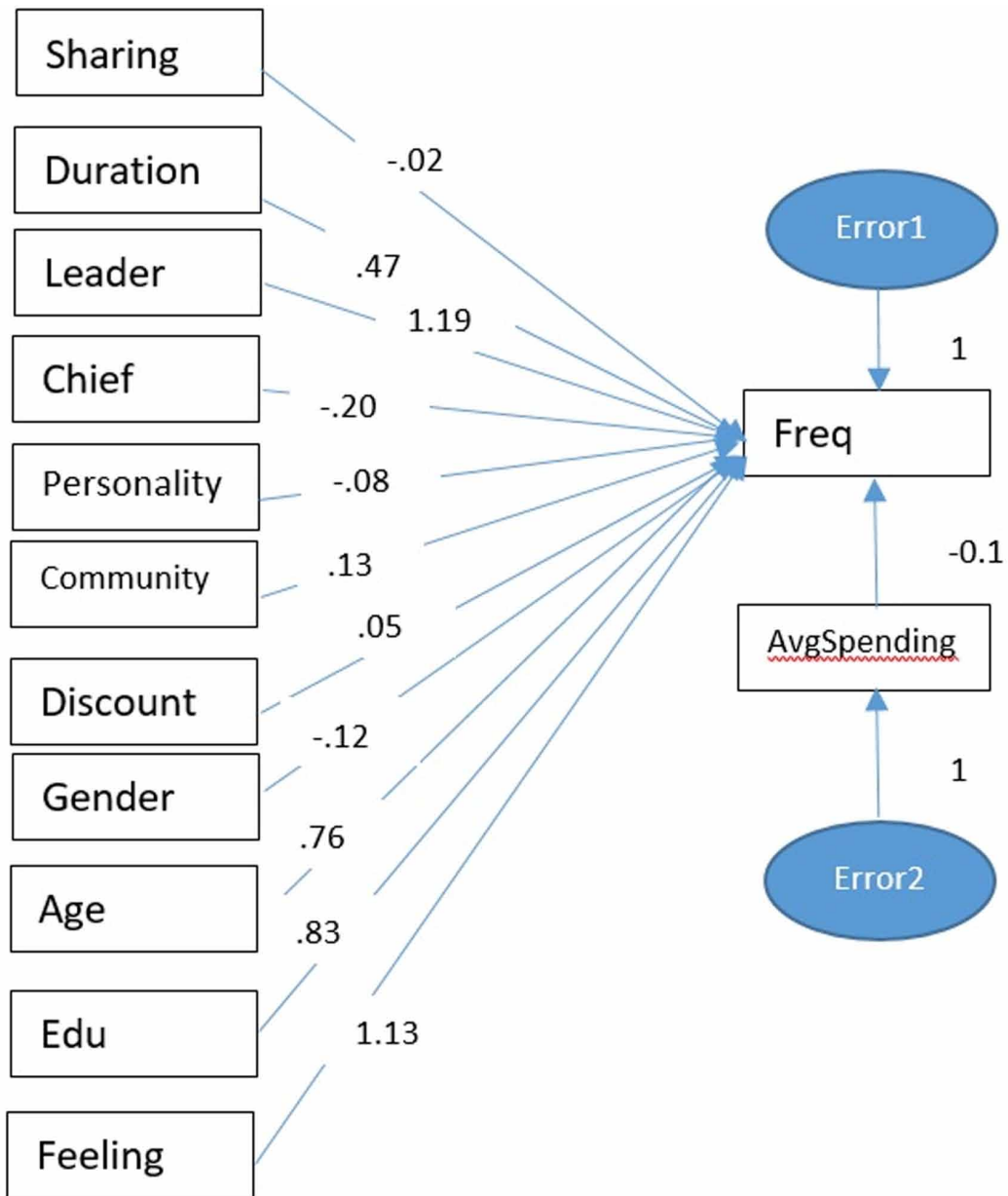


in the previous section. In the sub-section follows, we will attempt to explore more on the impact of the Edu and Gender variables.

To check the validity of the path specification, we study the goodness-of-fit statistics for both models. Table 6 shows the goodness-of-fit indexes. The chi-square is 12.054 and 16.703, respectively, with 11 degrees of freedom for both models. The probability level is 0.360 for Freq and 0.117 for AvgSpending. This suggests that we fail to reject the null hypothesis for both postulated path models. That is, both Freq and AvgSpending path models are valid (Bollen, 1989). Further, all goodness-of-fit indexes indicate that the models are well-fit. For example, GFI index for both models (0.989 and

Figure 3. Path model for avgspending
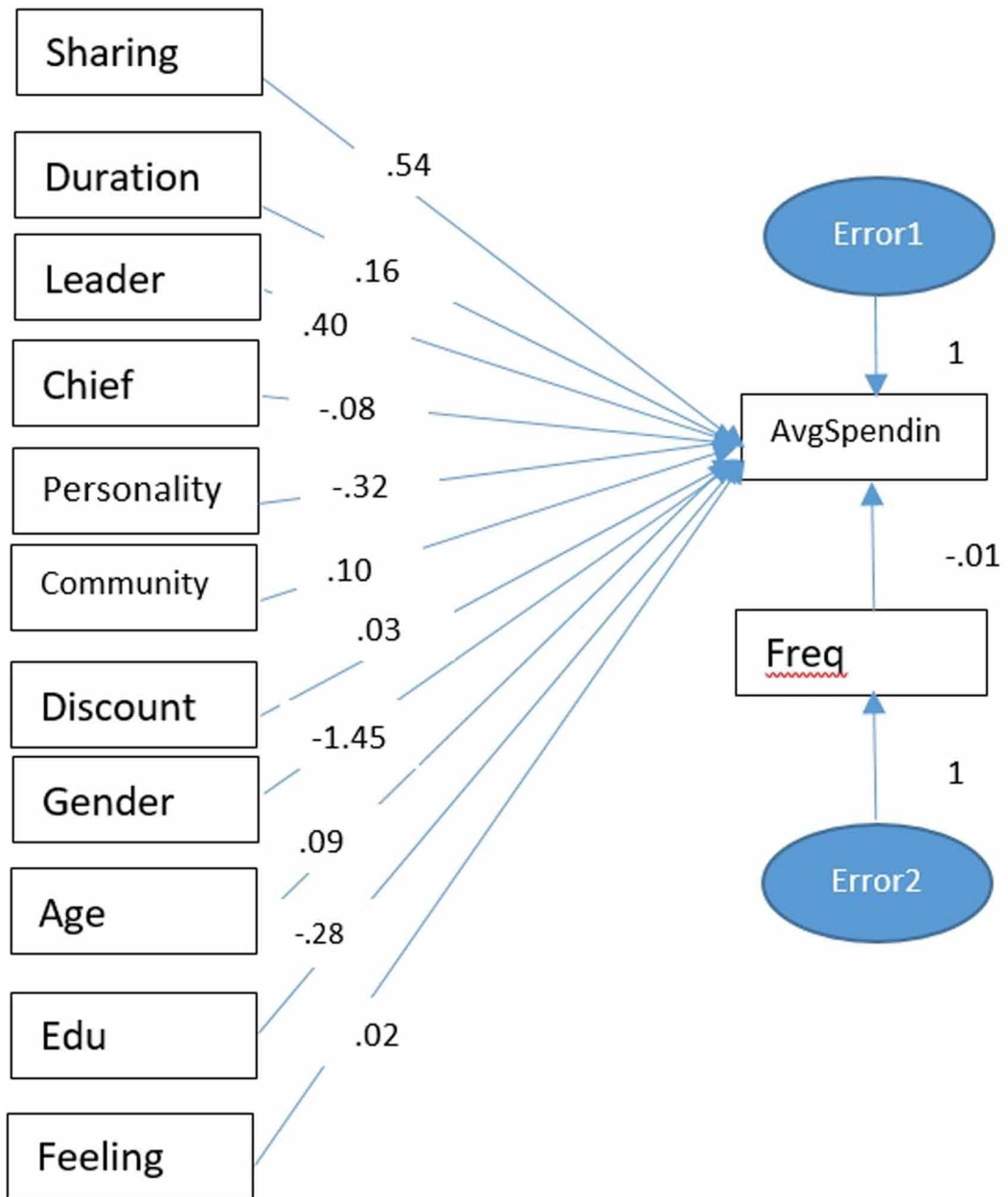


0.985) are close to 1.00, indicating a good fit of the postulated models (Hu and Bentler, 1999). The same conclusion holds for the rest of other indices (Bentler and Bonnett, 1980; Akaike, 1987; Hu and Bentler, 1999). We suspect the reason for not-so-many significant coefficients reported in Table 5 might be attributed to relatively small sample size (162 in this study).

**Table 5. Coefficient estimates and critical values**

| Dependent V. | Coefficient between Two Variables | Estimate | z-Value |
|---|---|---|---|
| Freq | Sharing $\longrightarrow$ Freq | -0.016 | -0.032 |
| | Duration $\longrightarrow$ Freq | 0.472 | 2.082* |
| | Leader $\longrightarrow$ Freq | 1.192 | 1.027 |
| | Community $\longrightarrow$ Freq | 0.128 | 1.013 |
| | Chief $\longrightarrow$ Freq | -0.197 | -0.331 |
| | Personality $\longrightarrow$ Freq | -0.081 | -0.375 |
| | Discount $\longrightarrow$ Freq | 0.050 | 0.865 |
| | Edu $\longrightarrow$ Freq | 0.757 | 2.781* |
| | Gender $\longrightarrow$ Freq | -0.117 | -0.170 |
| | Age $\longrightarrow$ Freq | -0.093 | -0.517 |
| | Feeling $\longrightarrow$ Freq | 0.041 | 0.171 |
| | AvgSpending $\longrightarrow$ Freq | -0.009 | -0.110 |
| AvgSpending | Edu $\longrightarrow$ AvgSpending | -0.276 | -1.103 |
| | Gender $\longrightarrow$ AvgSpending | -1.450 | -2.280* |
| | Age $\longrightarrow$ AvgSpending | 0.086 | 0.517 |
| | Community $\longrightarrow$ AvgSpending | 0.097 | 0.836 |
| | Discount $\longrightarrow$ AvgSpending | 0.030 | 0.572 |
| | Chief $\longrightarrow$ AvgSpending | -0.081 | -0.147 |
| | Time $\longrightarrow$ AvgSpending | 0.162 | 0.775 |
| | Leader $\longrightarrow$ AvgSpending | 0.403 | 0.377 |
| | Freq $\longrightarrow$ AvgSpending | -0.008 | -0.112 |
| | Personality $\longrightarrow$ AvgSpending | -0.319 | -1.612 |
| | Feeling $\longrightarrow$ AvgSpending | 0.021 | 0.096 |
| | Sharing $\longrightarrow$ AvgSpending | 0.538 | 1.181 |

Note: †: significant at 10% level; *: significant at 5% level; **: significant at 1% level.

## 4.3. Discussions and Managerial Implications

The descriptive analysis in this study describes the broad picture of members' demographics and their online parameters. For example, most OGB purchase is under $120 for each member. And majority

**Table 6. Summary of goodness-of-fit indexes**

| | Freq Path | AvgSpending Path |
|---|---|---|
| Chi-square | 12.054 | 16.703 |
| Degree of freedom | 11 | 11 |
| Probability level | 0.360 | 0.117 |
| RMR (Root Mean square Residual) | 0.072 | 0.149 |
| GFI (Goodness-of-fit Index) | 0.989 | 0.985 |
| AGFI (Adjusted Goodness-of-fit Index) | 0.909 | 0.876 |
| NFI (Normed-fit Index) | 0.923 | 0.894 |
| RFI (Relative Fit Index) | 0.455 | 0.245 |
| IFI (Incremental Fit Index) | 0.993 | 0.961 |
| TLI (Tucker-Lewis Index) | 0.905 | 0.487 |
| CFI (Comparative Fit Index) | 0.987 | 0.928 |
| RMSEA (Root Mean Squared Error of Approximation) | 0.024 | 0.057 |
| AIC (Akaike's Information Criterion) | 172.5 | 176.70 |
| ECVI (Expected Cross-Validation Index) | 1.069 | 1.098 |
| HOELTER 0.05 | 263 | 190 |
| HOELTER 0.01 | 331 | 239 |

of members purchase once at least 2-3 weeks. The descriptive analysis helps the OGB platform better understand its users. The summary of the importance of OGB factors, the perceived solutions to dispute handling and satisfactions on OGB provides the platform with useful information to address these issues. We list the top 5 responses in 3 categories from the subjects in the survey and discuss the managerial implications each. To the best of our knowledge, this is the first research to investigate these issues. As OGB is at an emerging stage in e-commerce, this descriptive and exploratory analysis could help build a better platform to serve OGB members and improve the new market's efficiency.

The path models show that duration (Duration), education (Edu) and gender (Gender) are significant variables for purchasing frequency (Freq) and average purchasing amount per member per order (AvgSpending). The higher level of education, the more frequent the members conduct OGB. The longer the membership, the more frequent the members conduct OGB. The female members are spending more on OGB than male ones. As the Freq * AvgSpending = Sales, we can see that attracting well educated and female people to join in one OGB platform, and keeping them stay in the platform for a longer time, would help boost the OGB sales. Platform builder might carefully design the OGB website and offer the features that well educated and female members like. Platform builder might use certain loyalty programs such as Frequent Buyer Program to boost the members' duration with the platform.

OGB members shows their different opinions on the important factors to join and succeed in an OGB platform. In the OGB framework, we know the members communicate to handle disputes and offer their feedback regarding satisfaction/dissatisfaction with their purchase. It is logical to further investigate whether consumers with various education backgrounds differ in opinions on the three issues reported in Table 3: Importance of OGB Factors, Dispute Handling, and Satisfaction. Similarly, we are also interested in discovering whether men and women are different in these opinions. These efforts help us better understand the impact of educations and genders of OGB members.

To compare the different opinions among people who have various education backgrounds, we use ANOVA test. Table 8 shows the test result for people with the four most reported degrees in Table 1, i.e., Senior High School, Community College, University, and Graduate School or Higher. The test result shows that the higher education a consumer receives, he/she will tend to place more emphasis on the following issues:

**Table 7. Top 5 responses and implications in 3 categories**

| Category | Top 5 Response | Managerial Implications |
|---|---|---|
| Importance of OGB Factors (5: Very Important; 1: Not Important at all) | Group members' personality (3.01) | Try to attract right persons to join |
| | Complimentary gift (2.98) | Free gift, coupon, and discount matter |
| | Self-achievement (2.63) | Let buyers feel getting a real deal |
| | Communication among group members (2.60) | Clear and accurate communication matters |
| | The group members' experience (2.58) | The longer they use OGB, the better; Need customer loyalty |
| Dispute Handling (5: Very Agree; 1: Very Disagree) | The members should make his/her own decision to solve the problems (4.05) | Let buyers handle their issues on their own |
| | The group-buying chief should yield to solve the problems (4.04) | Respect the members involved in dispute from the leadership |
| | The members should yield themselves to solve the problems (3.96) | Respect the members involved in dispute from the others |
| | The group-buying chief should make his/her own decision to solve the problems (3.48) | The significant role of OGB leadership |
| | The group-buying chief should compromise to solve the problems (3.04) | The moderator role of the leadership |
| Satisfaction (5: Very Satisfied; 1: Very Dissatisfied) | Personal feeling (2.49) | Users' demographics matter |
| | Self-achievement (2.32) | Let buyers feel getting a real deal |
| | Self-sharing (2.22) | Facilitate social media for info sharing |
| | The group-buying chief's authority and professionalism (2.15) | The significant role of OGB leadership |
| | Expanding interpersonal relationships (2.07) | Try to make OGB platform as social media for friendship |

For factors:

- Communication among group members;
- The group-buying chief's experiences;
- Cheap price;
- Risks concerned;

For dispute handling:

- The group-buying chief should compromise to solve the problems;

For satisfaction:

- Self-achievement;
- Getting along with other members.

It can be seen that the viewpoints of higher educated consumers do not necessarily match that of those who receive lower education. Sellers should carefully design their OGB platforms depending

**Table 8. ANOVA test result for variable edu**

| Importance of OGB Factors | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4* | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14** | 15** | 16* | 17 | |
| 1.6 | 2.3 | 2.5 | 3.0 | 1.9 | 1.7 | 1.7 | 2.0 | 2.0 | 1.7 | 2.0 | 2.4 | 2.6 | 2.6 | 3.0 | 2.6 | 2.5 | |
| Dispute Handling | | | | | | | | | | Satisfaction | | | | | | | |
| 1 | 2 | 3 | 4 | 5** | 6 | 7 | 8 | 9 | 10 | 1 | 2** | 3 | 4 | 5 | 6* | 7 | 8 |
| 1.6 | 3.0 | 4.0 | 2.0 | 3.5 | 1.8 | 3.0 | 4.0 | 1.8 | 4.0 | 1.8 | 2.1 | 2.5 | 1.7 | 2.1 | 2.0 | 2.3 | 2.2 |
| **Question tested:** *Is each factor different across the people with senior high school, community college, university, graduate school or higher?* | | | | | | | | | | | | | | | | | |

Significant: ***0.001 **0.01 *0.05

on the education levels of the major visiting constituents to optimize the market segmentation. As well-educated members are more likely to spend more money and buy more frequently, the OGB platform and sellers would do their best to server this segment of buyers.

For male and female consumers, we performed an independent t-test. Table 9 shows the test result. We find that male and female consumers have significantly different opinions on the two factors "The group members' experience" and "Product pre-trial or demonstration". For other factors, no different opinions are shown between genders. For dispute handling, male and female hold different views only on "The group-buying chief should respect majority opinions to solve the problems". There are quite a few satisfaction items where the two genders differ in, including:

- Self-achievement;
- Self-sharing;
- The group-buying chief's authority and professionalism;
- Getting along with other members;
- Sharing shopping information and experiences with group members;
- Discount concerned.

Again, the result shown here provides sellers and the platform with useful insights in terms of OGB mechanism design to optimally capture potential sales governed by the relative composition of genders on the shopping platforms. As male and female buyers are different in purchase satisfaction and dispute handling, the platform and buyers might need adopt different strategies to increase their

**Table 9. Independent t-test result for variable gender**

| | Importance of OGB Factors | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5** | 6* | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| F | 1.5 | 2.3 | 2.3 | 3.3 | 1.5 | 1.5 | 1.7 | 1.8 | 1.8 | 1.7 | 1.8 | 2.4 | 2.5 | 2.8 | 3.1 | 2.5 | 2.5 |
| M | 1.6 | 2.3 | 2.5 | 2.9 | 2.0 | 1.8 | 1.8 | 2.0 | 2.0 | 1.8 | 2.1 | 2.5 | 2.6 | 2.6 | 3.0 | 2.7 | 2.5 |
| | Dispute Handling | | | | | | | | | | Satisfaction | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7* | 8 | 9 | 10 | 1 | 2* | 3** | 4** | 5 | 6** | 7** | 8* |
| F | 1.8 | 3.0 | 4.0 | 2.1 | 3.9 | 1.8 | 3.4 | 4.0 | 1.9 | 4.2 | 1.8 | 2.5 | 3.0 | 1.5 | 2.5 | 2.6 | 2.8 | 2.7 |
| M | 1.6 | 3.1 | 4.1 | 2.0 | 3.4 | 1.8 | 2.9 | 4.0 | 1.8 | 1.0 | 1.8 | 2.0 | 2.4 | 1.8 | 2.1 | 2.0 | 2.2 | 2.1 |

Significant: ***0.001 **0.01 *0.05

satisfaction and handle their disputes properly. Further investigations and studies are needed to better address these issues. As a starting point, we believe this is a unique and significant contribution provided by this research.

## 5. CONCLUSION

We propose an Online Group Buying Decision Framework to model the OGB process. A survey was designed based on our framework. 162 responses were received from a total of 3,000 survey recipients. We analyzed these responses by providing simple statistics in the previous section. Some interesting phenomenon was observed. For example, a major portion of online group buying constituencies were female, with most of their age between 21 to 40 years old and 85% of them have at least community college degree or above. Most OGB purchase is under $120 for each member. And majority of members purchase once at least 2-3 weeks. This clear picture of the member structure and buying behavior in online group buying communities offers a great guidance for retailers to fine tune their selling policy and adjust their product lines for the OGB communities. The path model shows that the education, gender and OGB duration have impacts on members' purchasing frequency and average purchasing spending. Our findings suggest that OGB platform would like to attract well educated female to participate in and implement customer loyalty program to attain their OGB duration. We also discuss the members' differences in important OGB factors, dispute handling and satisfactions grouped by their educations and genders. In our opinion, the insights provided here is what has been missing in the literature.

The relatively few survey responses however, compared with the massive number of OGB (Taiwanese) consumers, does posit potential limitations to our results. Though we attempted to randomize our sample selection, one can argue that small sample can skew the overall picture of the real population. The use of the paper-and-pencil survey is another concern we have. Since online group buying consumers are reasonably familiar with Internet technology, a future direction would be to seek cooperating with OGB websites to conduct online (including websites and mobile apps) surveys. Further, we believe the survey does have its validity but can be strengthened by including more variables such as income level, Internet literacy, and after-sale satisfaction. As mentioned in the Introduction section, current Taiwan's e-Commerce market only accounts for 4.8% of its overall retailing market, compared with 7.3% in Europe and 9.4% in USA. The e-commerce operators in Taiwan have much room to improve and with every 1% more share they gain with respect to the overall retailing market, they can bring in US$ 9 billion more sales.

The study conducted here is in a society that has strong social bonding (i.e., Taiwan). Similar type of research can be extended to include cross-cultural studies on OGB activities. This has become increasingly relevant since most e-commerce operators now have a global visibility, e.g. Amazon.com and Alibaba.com. An accurate comparison of OGB consumption behavior across different culture can offer valuable recommendations to these operators in a fiercely competitive global e-commerce environment.

This work investigates the structures and processes of online group buying, which is a trendy activity in e-Commerce as can be evidenced by recent success in Groupon.com and others. The study conducted here serves as a strong motivation for retailers to move towards the next era of technology-supported businesses.

## REFERENCES

Akaike, H. (1987). Factor Analysis and AIC. *Psychometrika*, *52*(1), 317–332. doi:10.1007/BF02294359

Anand, K. S., & Aron, R. (2003). Group Buying on the Web: A Comparison of Price-Discovery Mechanism. *Management Science*, *49*(11), 1546–1562. doi:10.1287/mnsc.49.11.1546.20582

Assael, H. (2004). *Consumer Behavior: A Strategic Approach*. Houghton Mifflin.

Bentler, P. M., & Bonnett, D. G. (1980). Significance Tests and Goodness of Fit in the Analysis of Covariance Structure. *Psychological Bulletin*, *88*(1), 588–606. doi:10.1037/0033-2909.88.3.588

Bollen, K. A. (1989). *Structural Equations with Latent Variables*. Wiley. doi:10.1002/9781118619179

Che, T., Peng, Z., Lim, K. H., & Hua, Z. (2015). Antecedents of Consumers' Intention to Revisit an Online Group-Buying Website: A Transaction Cost Perspective. *Information & Management*, *52*(1), 588–598. doi:10.1016/j.im.2015.04.004

Chen, J., Chen, X., Kauffman, R. J., & Song, X. (2009). Should We Collude? Analyzing the Benefits of Bidder Cooperation in Online Group-Buying Auctions. *Electronic Commerce Research and Applications*, *8*(4), 191–202. doi:10.1016/j.elerap.2008.11.010

Chen, J., Chen, X., & Song, X. (2002). Bidder's Strategy Under Group-Buying Auction on the Internet. *IEEE Transactions on Systems, Man, and Cybernetics*, *32*(6), 680–690. doi:10.1109/TSMCA.2002.807029

Chen, J., Chen, X., & Song, X. (2007). Comparison of the Group-Buying Auction and the Fixed-Pricing Mechanism. *Decision Support Systems*, *43*(2), 445–459. doi:10.1016/j.dss.2006.11.002

Corfman, K. P., & Lehman, D. R. (1987). Models of Cooperative Group Decision-Making and Relative Influence: An Experimental Investigation of Family Purchase Decisions. *The Journal of Consumer Research*, *14*(1), 1–13. doi:10.1086/209088

Hu, L., & Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives. *Structural Equation Modeling*, *6*(1), 1–55. doi:10.1080/10705519909540118

Hu, M., Shi, M., & Wu, J. (2013). Simultaneous vs. Sequential Group-Buying Mechanisms. *Management Science*, *59*(12), 2905–2822. doi:10.1287/mnsc.2013.1740

Jeon, S., Qi, J., & Wang, J. (2017). Do Local Consumers Behave Differently from Visitors? An Exploratory Study in Online Group Buying. *Electronic Commerce Research and Applications*, *25*(1), 95–104. doi:10.1016/j.elerap.2017.08.004

Jr, M. (2001). Brand Community. *The Journal of Consumer Research*, *27*(4), 412–432. doi:10.1086/319618

Kauffman, R. J., & Wang, B. (2001). New Buyers' Arrival under Dynamic Pricing Market Microstructure: The Case of Group-Buying Discounts on the Internet. *Journal of Management Information Systems*, *18*(2), 157–188. doi:10.1080/07421222.2001.11045687

Kohli, R., & Park, H. (1989). Cooperative Game Theory Model of Quantity Discounts. *Management Science*, *35*(6), 693–707. doi:10.1287/mnsc.35.6.693

Ku, E. C. S. (2012). Beyond Price: How Does Trust Encourage Online Group's Buying Intention? *Internet Research*, *22*(5), 569–590. doi:10.1108/10662241211271554

Leong, L.-Y., Hew, T.-S., Ooi, K.-B., & Tan, G. W. (2019). Predicting Actual Spending in Online Group Buying – An Artificial Neural Network Approach. *Electronic Commerce Research and Applications*, *38*(1), 100898. doi:10.1016/j.elerap.2019.100898

Li, G., & Shi, X. (2012). An Empirical Study on Consumers' Continuance Intention Model of Online Group-Buying. *International Journal of Engineering and Manufacturing*, *5*(1), 83–95. doi:10.5815/ijem.2012.05.12

Lim, W. M. (2017). Online Group Buying: Some Insights from Business-to-Business Perspective. *Industrial Marketing Management*, *65*(1), 182–193. doi:10.1016/j.indmarman.2017.03.011

Lim, W. M. (2020). An Equity Theory Perspective of Online Group Buying. *Journal of Retailing and Consumer Services*, *54*(1), 101729. doi:10.1016/j.jretconser.2018.12.013

Schau, H. J., Muniz, A. M. Jr, & Arnould, E. J. (2009). How Brand Community Practices Create Value. *Journal of Marketing*, *73*(5), 30–51. doi:10.1509/jmkg.73.5.30

Sharma, V. M., & Klein, A. (2020). Consumer Perceived Value, Involvement, Trust, Susceptibility to Interpersonal Influence, and Intention to Participate in Online Group Buying. *Journal of Retailing and Consumer Services*, *52*(1), 101946. doi:10.1016/j.jretconser.2019.101946

Suki, N. M., & Suki, N. M. (2017). Modeling the Determinants of Consumers' Attitudes Toward Online Group Buying: Do Risks and Trusts Matter? *Journal of Retailing and Consumer Services*, *36*(1), 180–188. doi:10.1016/j.jretconser.2017.02.002

Wang, W.-T., Wang, Y.-S., & Liu, E.-R. (2016). The Stickiness Intention of Group-Buying Websites: The Integration of the Commitment-Trust Theory and E-Commerce Success Model. *Information & Management*, *53*(1), 625–642. doi:10.1016/j.im.2016.01.006

Zhang, Z., & Gu, C. (2015). Effects of Consumer Social Interaction on Trust in Online Group-Buying Contexts: An Empirical Study in China. *Journal of Electronic Commerce Research*, *16*(1), 1–21.

## APPENDIX

Survey of Group-buying Behavior

Dear Sir/Madam,

The purpose of this survey is to help us understand group buying activities at ihergo.com. We want to thank you for taking time to participate in the survey. The survey is absolutely anonymous and the information we collect will be solely used for our statistical analyses.

Q1: What key factor(s) lead you to join the (specific) community/communities of ihergo? (Check all that apply)
1. Sharing the shopping information and experiences.
2. Looking for the same interest friends.
3. For fun.
4. Reducing the product prices.
5. **Others** _____

Q2: How long have you been joining the (specific) community/communities of ihergo?
1. Under half a year.
2. Over half a year and under a year.
3. Over a year and under two years.
4. Over two years.
5. I don't know/can't remember

Q3: What role did you play in ihergo community/communities? (Check all that apply)
1. The group leader
2. The group-buying chief
3. Just a group member

Q4: How many (specific) communities of ihergo do you join?
1. One
2. Two
3. Three
4. Four
5. Five
6. Not certain
7. **Other** _____

Q5: On average, how often did you buy products via group-buying?
1. At least once a week
2. Once every two to three weeks
3. Once every three to four weeks
4. Once a month
5. Once a quarter
6. Once every half a year
7. Once a year
8. Not certain
9. **Other** _____

Q6: In the most recent 6 months, what's your average purchasing amount for each group-buying activity?
1. Under NT$500
2. Between NT$501 and NT$1,000
3. Between NT$1,001 and NT$2,000

4. Between NT$2,001 and NT$3,000
5. Between NT$3,001 and NT$4,000
6. Between NT$4,001 and NT$5,000
7. Between NT$5,001 and NT$6,000
8. Between NT$6,001 and NT$7,000
9. Between NT$7,001and NT$8,000
10. Between NT$8,001 and NT$9,000
11. Between NT$9,001 and NT$10,000
12. Over NT$10,001
13. I don't know

Q7: In the most recent 6 months, what kind of products do you usually order through group-buying?
(Check all that apply)
1. Food
2. Beauty products
3. 3C products (computer, communication and consumer electronics)
4. Airline tickets
5. Not certain
6. **Other _____**

Q8: On average, how much do you usually save on each group-buying discount?
1. 5 percent off
2. 10 percent off
3. 15 percent off
4. 20 percent off
5. 25 percent off
6. 30 percent off
7. 35 percent off
8. 40 percent off
9. 45 percent off
10. 50 percent off
11. Not certain
12. **Other _____**


Q12: What is your gender?
1. Male
2. Female

Q13: How old are you?
1. 6 – 15 years old
2. 16 – 20 years old
3. 21 – 25 years old
4. 26 – 30 years old
5. 31 – 35 years old
6. 36 – 40 years old
7. 41 – 45 years old
8. 46 – 50 years old
9. 51 – 55 years old
10. 56 – 60 years old
11. 61 – 65 years old
12. Over 66 years old

Q14: What is your education?

**Q9. To what extent are the following factors important to you when joining group-buying communities?**

| | ( 1: not important at all<br>2: unimportant<br>3: neutral<br>4: important<br>5: very important ) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| a. | Product quality | ☐ | ☐ | ☐ | ☐ | ☐ |
| b. | Product and brand awareness | ☐ | ☐ | ☐ | ☐ | ☐ |
| c. | Product pre-trial or demonstration | ☐ | ☐ | ☐ | ☐ | ☐ |
| d. | Complimentary gift | ☐ | ☐ | ☐ | ☐ | ☐ |
| e. | Discounts based on purchasing amount | ☐ | ☐ | ☐ | ☐ | ☐ |
| f. | Cheap price | ☐ | ☐ | ☐ | ☐ | ☐ |
| g. | Risks concerned | ☐ | ☐ | ☐ | ☐ | ☐ |
| h. | The group-buying chief's expertise | ☐ | ☐ | ☐ | ☐ | ☐ |
| i. | The communication ability of the group-buying chief | ☐ | ☐ | ☐ | ☐ | ☐ |
| j. | The group-buying chief's experiences | ☐ | ☐ | ☐ | ☐ | ☐ |
| k. | Communication between the group-buying chief and the members | ☐ | ☐ | ☐ | ☐ | ☐ |
| l. | The group-buying chief's personality | ☐ | ☐ | ☐ | ☐ | ☐ |
| m. | The group members' experience | ☐ | ☐ | ☐ | ☐ | ☐ |
| n. | Communication among group members | ☐ | ☐ | ☐ | ☐ | ☐ |
| o. | Group members' personality | ☐ | ☐ | ☐ | ☐ | ☐ |
| p. | Self-achievement | ☐ | ☐ | ☐ | ☐ | ☐ |
| q. | Self-sharing | ☐ | ☐ | ☐ | ☐ | ☐ |

**Q10. To what extent do you agree with the following solutions when there are disputes among group members?**

| | ( 1: very disagree<br>2: disagree<br>3: neutral<br>4: agree<br>5: very agree ) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| a. | The group-buying chief should coordinate a way to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| b. | The group-buying chief should compromise to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| c. | The group-buying chief should yield to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| d. | The group-buying chief should respect majority opinions to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| e. | The group-buying chief should make his/her own decision to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| f. | The members should coordinate a way to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| g. | The members should compromise a way to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| h. | The members should yield themselves to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| i. | The members should respect majority opinions to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |
| j. | The members should make his/her own decision to solve the problems | ☐ | ☐ | ☐ | ☐ | ☐ |

**Q11. How satisfied were you with the following in the most recent 6 months participating in group-buying activities?**

| | ( 1: very dissatisfied<br> 2: dissatisfied<br> 3: neutral<br> 4: satisfied<br> 5: very satisfied ) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| a. | **Sharing shopping information and experiences with group members** | ☐ | ☐ | ☐ | ☐ | ☐ |
| b. | **Expanding interpersonal relationships** | ☐ | ☐ | ☐ | ☐ | ☐ |
| c. | **Personal feeling** | ☐ | ☐ | ☐ | ☐ | ☐ |
| d. | **Discount concerned** | ☐ | ☐ | ☐ | ☐ | ☐ |
| e. | **The group-buying chief's authority and professionalism** | ☐ | ☐ | ☐ | ☐ | ☐ |
| f. | **Getting along with other members** | ☐ | ☐ | ☐ | ☐ | ☐ |
| g. | **Self-achievement** | ☐ | ☐ | ☐ | ☐ | ☐ |
| h. | **Self-sharing** | ☐ | ☐ | ☐ | ☐ | ☐ |

1. No education
2. Elementary
3. Junior High School
4. Senior High School
5. Community college
6. University
7. Graduate school or higher

The end. Thank you for your participation.

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