Using fuzzy set analysis to examine the determinants of repurchase intention and buyers' satisfaction in online group buying phenomenon

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ABSTRACT

Online group buying is a new business strategy in Yogyakarta, Indonesia. The concept is to get low priced products or services with more volume of orders. Building on previous studies, I examined the effect of reputation, trust, and perceived quality of consumer satisfaction and repurchase intention using qualitative comparative analysis (QCA) fuzzy set. I also added new variables namely social media usage and peer-reference in social media. QCA is known by its function to assess and to analyze different combinations of causations and complexity. Related to consumer behavior, results supported previous studies that perceived website quality affects high consumer satisfaction in online group buying. Meanwhile, high repurchase intention is affected not only by perceived website quality but also by trust towards the vendors and sellers. The rest of the determinants are known to partially affect the outcomes.

INTRODUCTION

The Internet is becoming more accessible and it opens a lot of possibilities and opportunities, including improvement in business, especially in terms of how corporations do their marketing communications and promotions. One of the potential options for business players is online group buying. The concept of online group buying basically sells products to more consumers, with discounts as the trade-off. In practice, consumers will choose deals that they desired, and when the volume target is fulfilled, the deal is granted and consumers get significant amounts of discounts for the products.

This study examines antecedents of satisfaction and purchase intention in online group buying. The predicted antecedents are the reputation of online group buying, perceived quality of the website, and trust towards the online group buying and towards the sellers in the online group buying. This study added the role of social media and peer reference in social media. These additional variables are expected to influence the outcomes, since there is a strong relation with the

outcomes. Social media is a very powerful tool used by companies, government to promote their activities or products. Meanwhile, peer reference in social media itself is the recommendation from other people. This study used the fuzzy set methodology as part of the qualitative comparative analysis. The objective of is to find out whether the result will support previous studies, which mostly used regression.

The internet-oriented research is growing nowadays with a lot of research related to e-commerce. This study will contribute to understanding more the behavior of people in online group buying, by adding the role of social media and peer reference. Furthermore, with fuzzy set methodology, this study will analyze what are the best combinations of antecedents that can have a maximum outcome.

LITERATURE REVIEW

This study looked into five determinants of consumers' satisfaction and repurchase intention in online group buying. Four of them represent the management of the website, and one of them represents the external factor: the role of peers and peer communication. Online group buying is a way of selling, which rely on voucher discount usage. The more people have a deal or showing an intention to buy, the more it is possible for consumers to get discounts for certain products and services. In Indonesia, there are several famous online group-buying systems such as *Groupon*, disdus.com, lakupon.com, deal.co.id, ogahrugi.com, valado.com, and mbakdiskon.com. The mechanisms of these online group-buying basically is like online purchases. The buyers view a certain deal that he/she is interested in, chooses the deal or discount, and waits until a certain amount of time in order to see whether the volume of that product/service deal has been fulfilled. When the volume is already fulfilled, buyers confirm the deal, make a payment which is discounted, and website vendor sends an email confirming the purchase of the deal. The coupon will be applicable over a time period, and when the buyers wish to avail of the discount coupon, he/she brings the email confirmation to the seller. Online group buying is effective for new businesses that have not gain of attention yet, and the process of attracting more consumers. The reputation of the vendor of online group buying is important since the more people acknowledge the vendor and befriend with vendor's social media, the more people know about the deal information and the faster information is be disseminated. Therefore, in the end, more people notice the deal and the seller's brand. The target market for this method is middle-lower class and an online group buying is prominent among students. In some regions like Yogyakarta, which has several universities and colleges, online group buying is more preferred.

Products are commonly valued based on reputation. The same thing also applies to online group buying. From the explanation above, a key factor to online group buying vendor achievement. Web sites with good reputation tend to get more attention and hence attract consumers. In some cases, reputation can even forecast future performance (Resnick & Zeckhauser, 2012); have a direct relation with loyalty in an online setting (Caruana & Ewing, 2010); and is said to be a good tool for identifying good-faith seller (Jin & Kato, 2006). Shiao and Luo (2012) explained that reputation is part of a social process and somehow by the

knowledge sharing of provider's website, it can add more intangible assets (such as better reputation, increased personal status, and increase positive feelings from a provider). The authors who support that website's reputation play an important role for repurchases intention and consumers' satisfaction are Hsu, Chang, and Lee (2014), Cheng and Huang (2012), Shiau and Luo (2012). Reputation sometimes also becomes a measurement and a factor for someone to finally decide to purchase products. This phenomenon is actually vital and commonly act as consideration for providers of online group buying websites. Several aspects cause bad reputation namely fraud, obscurity, or inaccuracy in giving information. These, later on, forms bad quality perception, which is also related to trust, and cause consumers hesitate to purchase from the same vendor. Therefore, the author supports that reputation is related and affects purchase intention and satisfaction of consumers.

According to Hsu, et al (2014), perceived quality of a website in online group buying consists of three parts: system quality, information quality, and service quality. Perceived web quality is a matter of perspective, especially on how consumers' opinion and view related website of the provider. Perceived quality of a website can be accounted as a precise measurement because it is seen objectively from the consumers' point of view. Perceived quality of a website also allows the business owner or researchers analyze which part of the website needs more improvement. Website quality was explained to have a direct and positive impact on consumers' satisfaction (Bai, Law & Wen, 2008). In some cases, website quality outlined into several other aspects such as design, interactivity, informative, security responsiveness and trust; altogether they affect consumers' satisfaction (Lin, 2007). Other studies who also found that perceived quality play a role in a business are Kim and Niehm (2009), Wells, Valacich, and Hess (2001), and also Hwang and Kim (2007). Hsu, et al (2014) added that the seller's perceived web quality affect consumers' satisfaction, also because seller's perceived web quality can give additional perception about information quality and service quality from the sellers' perspective. However, this paper only considers perceived web quality from the consumer's perspective because it is seen as sufficient to represent the quality of websites.

Trust is one of the outcomes of bad management skills and lack of quality management from the provider. Trust is related strongly to other aspects and also triggered by one or more unpleasant occurrences. Trust is very important in the e-commerce business since there is no face-to-face interaction between buyers and sellers; buyers sometimes do not see the physical appearance of the products, and hence trust is vital in online businesses. Gefen, Karahanna, and Straub (2013) described that trust can be achieved from several things: understanding that the vendor gets nothing from fraud and that there is a safety mechanism in e-commerce. Him, Sia, and Lee (2006) finds that trust has the ability to lead to actual buying behaviors. Yoon (2002) also agrees that trust affecting the online-purchase intention.

Social media is now having a rapid growth, especially among generation X who get most exposure towards technology and Internet development. In this global era, a lot of businesses involve themselves in the hype of online selling. A lot of corporations maximize their online media and social media such as website,

facebook, twitter, etc. As Lang (2010) cites in Habibi, Laroche, and Richard (2013) people spend a third of their daily life being online. Furthermore, consumers of online or Internet actively have a part and give contribution for the content (Habibi, Laroche & Richard, 2013). This understanding more or less becomes a strong justification on how companies should consider their online management skills. Some other authors believe that offering different platforms and different kinds of social media might affect brand loyalty (Erdogmus & Cicek, 2012). Mangold and Faulds (2009) stated that social media is a hybrid element in businesses' marketing mix. Submarani and Rajagopalan (2003) studied about knowledge-sharing activity and influence in social media marketing. In a more advanced explanation, social media's role in boosting peer communication was known to have an impact towards purchase decisions directly and indirectly (Wang, Yu & Wei, 2012). The online management skills in this case also include the ability of a company to have an active offering of their deals and fast response when communicating with consumers in social media.
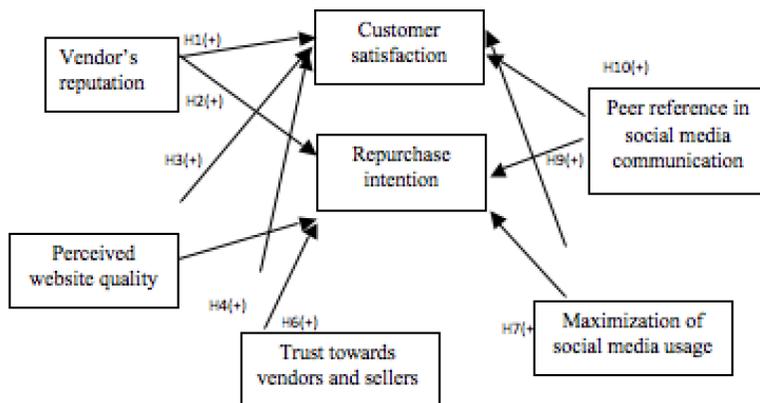

Figure 1. The Research Model

Bamberger and Biron (2007) as cited in Tai, Hong, Chang, and Chen (2012) defined peer reference as a result of the level of trust and experience in a social communication context. Tai et al (2012) also argue that reference or the ability of someone to refer to something provides for better understanding of products of the company. Peer reference, in this case, can be understood as the influence of peers and friends inside an online or social media circles. Friends that recommend something on Facebook, relatives, and family members that re-tweet some information related with the online group-buying provider, and so on. By this condition, the author argues that the possibility of someone to purchase products gets higher when his/her relatives refer to a certain product or online group buying provider. Peers are known to have an influence towards product and brand decision (Childers & Rao, 1992). Ward (1974) and Churchill and Moschis (1979) cited in Wang, Yu, and Wei (2012) it is believed that interactions with peers is a fundamental act that can influence someone's attitude upon products.

RESEARCH METHODOLOGY

Data collection and cases

The data was collected through online survey of people who experienced online group buying. Because of the nature of QCA (fuzzy set) that considers the opposite outcome from a pile of data, it is not a problem to have a medium amount of data sample, around 105 cases (Devers, 2013). There is an 11-data sample (cases) in total and two of them have incomplete data, in other words, the questionnaires from participants who did not fill all the survey's questions are dropped.

Methods

The first step is data gathering through a questionnaire, using Likert scale - the questions reflecting participants' perspectives upon each causal condition. Because of the scarcity of sample data, the author decided to include the two defective samples, by doing some adjustments. There are seven sections in the survey, which measure each variable.

Table 1. Variables' measurement

Measurement
Website's reputation (Hsu et al, 2014; Shiao & Luo, 2012)
1. Online group buying website that I ever used is a famous vendor that is well-known by a lot of people and my relatives
2. Online group buying website that I ever used is an online group buying vendor which has good reputation
3. Online group buying website that I ever used is an online group buying vendor which has a good reputation because of its honesty
Perceived quality of the website (Hsu et al, 2014)
1. Online group buying website that I ever used, gave good service to me
2. I feel an easiness in accessing content of online group buying website that I've used
3. The online group buying website that I ever used gave me precise information
4. The online group buying website that I ever used, gave me the latest (up-to-date) information
Trust towards the web and trust towards the sellers on the website (Shiao & Luo, 2012; Hsu et al, 2014)
1. Online group buying website that I ever used is a secure website
2. Online group buying website that I ever used is a trusted website
3. Online group buying website that I ever used is a reliable website
4. I feel secure to have a transaction with online group buying that I ever used
5. I'm sure that I will get any fraud incident by using that online group buying website
6. I have trust towards the sellers within the online group buying website
7. The sellers within the online group buying website gave a trustable impression
Maximization of social media usage (Wang et al, 2012)
1. The online group buying website has a social media that I follow (or befriend

with)
2. The online group buying website often shares information about service and product selling by the sellers in the social media
3. The online group buying website actively interacts with the candidate of buyers in the social media
4. The social media account which is owned by the online group buying website is an active account and got a fast response

Peer reference & peer communication in social media (Tai et al, 2012; Wang et al, 2012)
1. I often talk about products and services which are offered by the social media account of online group buying website with my peers
2. I often show the products and services which are offered by the social media account of online group buying to my peers
3. I often get information about products and services which are offered by online group buying website through the social media which are shared by my peers
4. In the social media, my peers often suggest to me to purchase products and services which are offered by social media account of that online group buying website

Consumers' satisfaction (Tai et al, 2012; Shiao & Luo, 2012)
1. I feel very satisfied with my experience purchasing something in that online group buying vendor
2. I feel very pleased with my experience purchasing something in that online group buying vendor
3. I'm not regretting my decision to purchase product/service from the online group buying vendor
4. I think buying product and service through that online group buying vendor is a good idea

Repurchase intention (Tai et al, 2012; Shiao & Luo, 2012)
1. I have the intention to use that online group buying vendor again in the future
2. I have the intention to continue to use that online group buying vendor again in the future
3. I think I will buy products and services which are offered by the online group buying vendor in the future

Each variables measurement will have a maximum value, as a result of accumulation. For example, measurement "repurchase intention" will have a maximum number of 15. Each sample's number will then be divided by this maximum number, and then multiplied by the maximum threshold of fuzzy set (in this paper, the author uses 1, 3, and 5 as the threshold).

The second step is calibrating the raw data into fuzzy sets by using three-value scheme (1,3, 5 as threshold). The third step is analyzed with fuzzy set truth table, and also selects the frequency and the consistency threshold. In this paper, the author uses a value of 0.95 as the cutoff consistency. Ragin (2008) cited in Skarmeas, Leonidou, and Saridakis (2014), mentioned that consistency measures the degree which solution is the suitable one for the outcome. After the numbers are calibrated into a value, which is appropriate for the software to compute,

there will be many possibilities of outcome and variables that the researcher desired. In other words, the researcher is able to decide what kind of outcome is expected. This is one example that differentiates qualitative comparative analysis with regression. The researcher is able to set and able to figure out in an opposite condition of the outcome, what independent variables are needed. Additionally, the author is also able to set the opposite of independent variables, and figure out the final result of the outcome. The last step is to choose from three options: parsimonious, intermediate, and complex; and finally, interpret the data result.

RESULTS

This part presents two analyses: the first examines what condition causes the repurchase intention and consumer satisfaction, and the second examines what condition causes the absence of repurchase intention and consumer satisfaction.

The models for analyses are:
1. cs = f(RW, PWQ, TS, MoSMU, SMPC)
2. ~cs = f(RW,PWQ,TS,MoSMU, SMPC)
3. ri = f(RW, PWQ, TS, MoSMU, SMPC)
4. ~ri = f(RW, PWQ, TS, MoSMU, SMPC)

Symbol (~) indicate a negation, with this explanation for each letter:
1. "cs" = consumers' satisfaction
2. "ri" = repurchase intention
3. "RW" = reputation of website (vendor)
4. "PWQ" = perceived web quality
5. "TS" = Trust
6. "MoSMU" = Maximization of social media usage
7. "SMPC" = Social media peer communication

Table 2. *Data of un-calibrated variables*

Un-calibrated variables							
Case	RW	PWQ	TS	MoSMU	SMPC	CS	RI
1	3.75	3.75	3.39	3.44	3.75	2.81	3.33
2	3.75	3.75	2.50	3.75	3.13	3.75	2.50
3	1.25	3.75	3.21	2.81	2.81	2.81	3.75
4	3.33	3.75	3.75	3.44	2.81	3.13	3.75
5	3.75	4.38	4.64	4.38	4.06	2.81	5.00
6	3.75	3.75	3.93	4.06	2.81	3.75	3.75
7	4.17	4.06	4.82	3.75	3.13	3.75	3.75
8	4.17	4.69	3.21	3.44	1.88	3.75	3.75
9	4.17	3.44	3.21	3.44	1.88	3.75	3.75
10	5.00	4.69	4.46	3.75	3.75	3.75	3.75
11	4.17	3.75	3.21	2.81	3.13	3.75	2.92

Table 3. Data of calibrated variables

				Calibrated variables			
Case	cRW	cPWQ	cTS	cMoSMU	cSMPC	cCS	cRI
1	0.75	0.75	0.64	0.66	0.75	0.43	0.62
2	0.75	0.75	0.32	0.75	0.55	0.75	0.32
3	0.07	0.75	0.58	0.43	0.43	0.43	0.75
4	0.62	0.75	0.75	0.66	0.43	0.55	0.75
5	0.75	0.89	0.92	0.89	0.83	0.43	0.95
6	0.75	0.75	0.80	0.83	0.43	0.75	0.75
7	0.85	0.83	0.94	0.75	0.55	0.75	0.75
8	0.85	0.93	0.58	0.66	0.16	0.75	0.75
9	0.85	0.66	0.58	0.66	0.16	0.75	0.75
10	0.95	0.93	0.9	0.75	0.75	0.75	0.75
11	0.85	0.75	0.58	0.43	0.55	0.75	0.47

Originally, the fuzzy set analysis will have three types of solutions: complex, intermediate, and parsimonious. This study focuses on the complex results. Research results are adapted from Skarmeas, Leonidou, and Saridakis (2014). Complex solution is used because it contains no basic notion, as Elliot (2013) and Ragin and Sonnett (2005) cited in Skaremeas, Leonidou, and Saridakis (2014). The cutoff for this research is 0.95, which means that the lower combination values less than this number will not be used.

Table 4. Complex solution for the outcome findings

Complex solution	Raw coverage	Unique coverage	Consistency
Customers' satisfaction findings			
Model: cs = f(rw, pwq, ts, mosmu, smpc)			
~rw*pwq*ts*mosmu*~smpc	0.310296	0.050776	0.940171
rw*pwq*ts*mosmu*~smpc	0.595204	0.236954	0.995283
rw*pwq*ts*~mosmu*smpc	0.373766	0.016925	1.000000
rw*pwq*~ts*mosmu*smpc	0.339915	0.035261	1.000000
Solution coverage: 0.710860; solution consistency: 0.969231			
Frequency cutoff: 1.000000; consistency cutoff: 0.940171			
Repurchase intention findings			
Model: ri = f(rw, pwq, ts, mosmu, smpc)			
rw*pwq*ts*mosmu	0.817346	0.203679	0.996795
rw*pwq*ts*smpc	0.618922	0.005256	0.979210
~rw*pwq*ts*~mosmu*~smpc	0.307490	0.065703	1.000000
Solution coverage: 0.888305; solution consistency: 0.985423			
Frequency cutoff: 1.000000; consistency cutoff: 0.969811			

Consumers' satisfaction

From the complex solution, there are several combinations of antecedents that can result in high consumers' satisfaction. The first pathway indicates that high

reputation, high perceived website quality, high trust, and high maximization of social media usage lead to high consumers' satisfaction (consistency = 0.90; coverage = 0.79). The second pathway consists of high reputation, high perceived website quality, high trust, and high peer reference in social media communication (consistency = 0.88; coverage = 0.60). The third pathway consists of high reputation, high perceived website quality, high maximization of social media usage, and high peer reference in social media (consistency = 0.88; coverage = 0.619). The last pathway consists of low reputation, high perceived quality of the website, high trust, low maximization of social media usage, and low peer reference in social media communication (consistency = 0.94; coverage = 0.31). Refer to Skarmeas, Leonidou, and Saridakis (2014), there are several antecedents, which sometimes occur as high determinant, and sometimes they occur as low determinants. This indicates that that certain antecedents or conditions are not those essential for the outcomes. However, by seeing the consistency and coverage, and how many times the determinant occur in a pathway, some 'inconsistent' antecedents should not be ignored completely.

Repurchase intention
From the complex, the first pathway that can lead to high repurchase intention consists of high reputation, high perceived website quality, high trust, and high maximization of social media usage (consistency = 0.99; coverage = 0.81). The second pathway consists of high reputation, high perceived website quality, high trust, and high peer reference in social media communication (consistency = 0.97; coverage = 0.61). The third pathway consists of high reputation, high perceived website quality, high maximization of social media usage, and high peer reference in social media communication (consistency = 0.94; coverage = 0.61). The fourth pathway consists of low reputation, high perceived website quality, high trust, low maximization of social media usage, and low peer reference in social media communication (consistency = 1.00; coverage = 0.30).

DISCUSSION OF THE RESEARCH FINDINGS
This study uses the fuzzy set methodology as an alternative research method. One of the goals is to compare whether the results validate previous research. In reference to Skarmeas, Leonidou, and Saridakis (2014), Table 4 shows complex solution design.

In Table 5, the small black circles indicate a high presence of a condition, and small white circles indicate the low presence of a condition. Large black (or white) circles indicate a core and necessary condition of presence (or absence). Blank spaces indicate, "don't care". The "ф" indicates a not necessary condition. Ticks (ν) indicate that the hypothesis is supported; an "x" indicates that the hypothesis is not supported and "ɤ" indicates that the hypothesis is supported partially. From the table above, it can be seen that there are three determinants, which support the previous research on, repurchase intention and consumers' satisfaction.

Perceived website quality is found as the only strong determinant towards high consumers' satisfaction. In this paper, quality can be described as vendor's website service, precise information, up-to-date information and ease for

the consumers. The rest of the predicted determinants are found to be conditionally affecting the high consumers' satisfaction. However, by seeing the occurrence in the path, the consistency, and the coverage value, some determinants strongly affect (reputation, trust, and maximization of social media usage). Peer reference conditionally affects consumers' satisfaction. This might be caused by the indirect relationship between peer reference and consumers' satisfaction.

For the other outcome, perceived web quality is seen as a strong determinant of repurchase intention. Trust towards the vendors and sellers are also a strong determinant of repurchase intention. These findings support the previous studies. Social media maximization and peer reference in social media communication are known to affect repurchase intention conditionally. In reality, this condition might be caused by others factors such as the duration a consumer spends time online, or how close the relationship is with the peers.

Table 5. Solution and pathways

	Outcome condition								
	Customers' satisfaction pathways					Repurchase intention pathways			
	1st	2nd	3rd	4th	Conclusion	1st	2nd	3rd	Conclusion
Reputation	○	●	●	●	φ (H1 ✗)	●	●	○	φ (H2 ✗)
Perceived website quality	●	●	●	●	● (H3 √)	●	●	●	● (H4 √)
Trust (to vendor and sellers)	●	●	●	○	φ (H5 ✗)	●	●	●	● (H6 √)
Maximization of social media usage	●	●	○	●	φ (H7 ✗)	●		○	φ (H8 ✗)
Peer reference in social media communication	○	○	●	●	φ (H9 ✗)		●	○	φ (H10 ✗)

CONCLUSIONS

This study provides additional references on consumers' satisfaction and repurchases intention, especially in an online group buying case. By using fuzzy set, this study calculates complex and more possible conditions and combinations that the previous studies have not covered yet. Although results show strong support only on the role of perceived website quality, variable trust and reputation are still debatable in terms of how they showed almost full condition support of the hypothesis. The role of social media and peer reference is not really contributive, as what was predicted. However, there are still minor pathways and conditions to fulfill the hypothesis. There is strong possibility that this rejection of support is due to the complex outcome mode. If the option is changed into the parsimonious outcome, the result seems to change. This study suggests other perspectives and possibilities of new methods in order to complement and enrich previous research works.

The limitation of this study is assessed on the development of the measurement and questionnaire items. The author refers to previous fuzzy set research and builds measurement of variables by exploring previous literature. This effort seems incomplete and not thorough enough since there is no clear mechanism on how the sequence and consideration of item measurements are chosen. Future studies should be able to understand how well the variable

measurement in a fuzzy set is constructed and make a distinctive view of the forming process of item measurement in the qualitative comparative analysis. Finally, another drawback of the paper is the choice of variables. In some previous papers, there are variables, which are supported having a direct effect on the outcome, but those variables are not included in this paper. Future research should analyze and carefully select the best independent variables for this topic.

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