



REVIEW VOLUME, CONSUMER RATINGS, AND RENTAL PRICE IN THE SHARING ECONOMY: THE CASE OF AIRBNB JAKARTA

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Abstract

Online reviews are emerging as a powerful source of information influencing consumers' pre-purchase evaluation. This phenomenon has emphasized the need for a further comprehension of the impact of online reviews on consumer attitudes and behaviors, particularly in the sharing economy platforms. This study aims to examine the relationship of attributes in Airbnb listings towards online reviews and measure the effect of online reviews towards rental price. To examine the hypothesis and drawing conclusion, a web-crawling code was developed to collect data related with the characteristics of Airbnb's listings, the attributes of the hosts, and the reputation of the listings. The model was tested by using a dataset of 413 Airbnb listings within Jakarta area over a period of Airbnb's launch in January 2012 until May 2018. The data collected from the survey was processed and analyzed through multiple linear regression model, t-test, and f-test. The results of this study indicate that an online review is not a significant aspect in determining rental price of an accommodation. Furthermore, the findings highlight the importance of a "superhost" badge to influence review volume, while membership duration represents the key reason that affects both review volume and consumer ratings.

Keywords: *Online Reviews; Airbnb Listings; Web-crawling; Review Volume; Consumer Ratings; Rental Price*

INTRODUCTION

Background

Online reviews in the e-commerce era have significant importance for consumers because they are useful yet reliable and objective in influencing consumer attitudes and behavior (Liang, Schuckert, Law & Chen, 2017). Through online reviews, consumers are able to get information about the products or services, shopping experience, service quality, the seller's credibility, and trustworthiness. Testimonial reviews, a part of an online review, come in the form of short essays comprise a brief description of user experience about the products or services. In order to get a better grasp of the actual

experience, a testimonial review provides consumer with stories and cases. Customer ratings, another part of an online review, allows consumers to make direct comparison and judgment of product or service quality, which helps them make a final decision (Zhang, Ye and Law, 2011). Moreover, customer ratings help consumers to better filter target products or services (Liang, Schuckert, Law & Chen, 2017).

Online reviews are beneficial for peer-to-peer marketplace to increase sales. Typically, in making purchase decision, consumers tend to consider products with positive reviews and/or higher customer ratings (Hudson, Roth, & Madden, 2015). Furthermore, recent studies on hotel industry show that review volumes can increase consumer booking intention (Ye, Law, Gu & Chen, 2011; Sparks & Browning, 2011). Therefore, it is important for businesses who targeted online consumers to understand the factors that influence the general valence of the reviews (whether they are predominantly positive or negative).

Our aim with this research mainly focuses on Airbnb's badge system as its study subject. Airbnb, founded in 2008 to accommodate travel community finding spaces and experiences during a trip, is a peer-to-peer online marketplace and homestay network that allows people to list or rent short-term lodging in residential properties. The company tries to answer unfulfilled demand for satisfactory accommodations for budget concerned travelers. Lately, the company has become an important player in the accommodation provider industry.

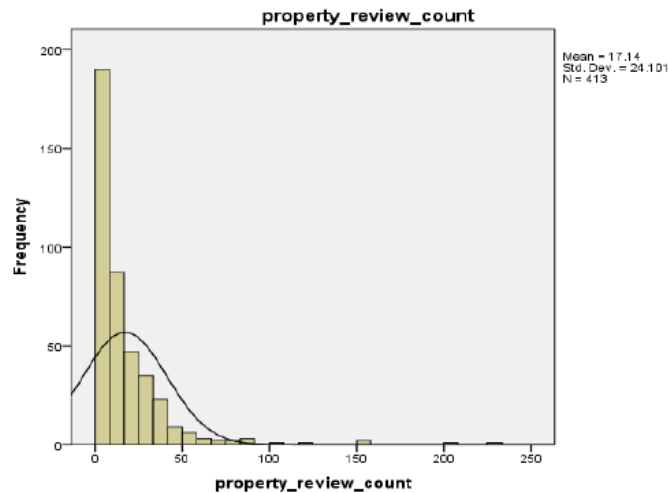
According to Verhagen, Meents, & Tan (2006), in the online transaction, three parties are involved with each other, i.e. the seller, the buyer, and the intermediary (platform). In today's sharing economy platforms, the products or services are shared among people who do not know each other, and who lack friends or connections in common (Belk, 2014). When selecting the places to stay, Airbnb guests are able to obtain information about the accommodation that the host has entered in. This type of information is posted by the host which includes facilities, photos, rental price, rules, and basic information about the host. Moreover, these information factors on the individuals collectively have significant effects on sales and demand of Airbnb accommodation (Yong & Xie, 2017).

Another type of information is the attributes of the host, which includes acceptance rate, respond time, Superhost status, and verified status. This information, which denotes the performance of a host, is posted by Airbnb directly, hence the accuracy and less-biased of it. The other type of information is the reputation of listings, including reviews and customer ratings of an accommodation. This type of information is posted by guests after using the host property, comprises the evaluation, and judgement about their experience and the service quality of the host.

Online review in Airbnb platform is important for both consumers and property owners. However, after conducting pre-research from 413 listings, the results show that there is an uneven distribution for the online reviews (see Figure 1). The horizontal axis is shown by "property_review_count" which designates the number of online list or posted information for accommodations on Airbnb Jakarta and the vertical axis by "frequency" which represents the number of reviews within a given number of listings. The online reviews in Airbnb Jakarta listing are most likely skewed to the left, which means that the majority of listings have a low volume of reviews. This condition shows that the relatively small number of reviews have emphasized a limited amount of quality information about the properties. Therefore, it has the potential of lowering the property occupation rate because consumers are unlikely to choose an accommodation with

insufficient reviews (Sotiriadis & Zyl, 2013). Accordingly, lower occupation rate implies lack of demand. Ert, Fleischer and Magen (2016) argued that lower occupation rate has negative association with price increase.

Figure 1. Review Volume Distribution



Accordingly, the objective of this study is to examine factors that affect review volume and consumer ratings of an accommodation and to understand the relationships among the important factors that influence rental price. Furthermore, this paper tries to contribute by building upon existing literature by looking at the characteristics unique to developing countries like Indonesia and to relate digital badge with the online reviews in the tourism industry.

LITERATURE REVIEW

In order to motivate engagement between property owner and user, Airbnb uses badge system called “Superhost” that represents higher status in Airbnb community. To obtain and keep “Superhost” badge, property owners should maintain higher service quality and more experience in Airbnb community, e.g. to achieve certain overall rating, respond rate, a minimum number of years as a host. Cavusoglu, Li, and Huang (2015) identified that a badge system is an effective gamification design to increase user engagement.

Number of bedrooms refers to the quantity of bedrooms a house or apartment can provide. In Airbnb, there are three types of accommodation, i.e. entire house, entire apartment, or room only. Each type of accommodation has different number of bedrooms that can be provided. The number of bedrooms ranging from zero to ten. Zero means that the accommodation is either room only type or a studio apartment. Usually, accommodation with more than two bedrooms is a house. According to Liang, Schuckert, Law, and Chen (2017), the number of bedrooms shows different effect on review volume and ratings.

Cancellation policy allows guest or host to cancel travel plan by clicking “Cancel” on the appropriate reservation. Cancellation policy determines how much fund a guest could obtain when cancelling a reservation. In peer to peer marketplace like Airbnb,

photos play an important role in attracting guest intention and trust. Aside from verbal description, photos help guest to picture the accommodation. Liang et al. (2017) suggest that a more detailed information like photos can make an accommodation more attractive and increase its review volume.

Airbnb displays information of membership duration as a symbol of host reputation and experience among the community. Membership duration is a signal of trust in peer to peer marketplace since long-existing account is built upon long-term engagement with the community, thus a longer existing accounts are less likely to be fraud (Teubner, Dann, & Hawlitscheck, 2017). With increasing experience due to longer membership, host may adapt with market and have higher performance than others. Thus in peer to peer market, a longer membership host may build social capital which can influence consumer satisfaction (Huang, Chen, Ou, Davidson, & Hua, 2017).

Review volume determines the amount of information consumer can obtain. According to Xie, Chen, and Wu (2016), review volume is a significant factor in association with hotel attraction. Moreover, a product with more reviews is more likely to attract potential customer attention (Zhang, Zhang, Wang, Law, & Li, 2013).

On the other hand, consumer ratings represent impression and evaluations of the consumers towards products or services (Schuckert, Liu, & Law, 2015). Xie, Zhang, and Zhang (2014) added that ratings represent consumer satisfaction and the valence of electronic word of mouth. The higher the rating, the more positive the review a host can get. Therefore, ratings help consumer to make direct comparison with other products or services and provide the means to make final purchase decision (Zhang, Ye, & Law, 2010).

Hypothesis Development

According to a previous study by Bulchand-Gidumal, Melián-González, & González LópezValcárcel, (2011) with a data from more than 10,000 hotels from TripAdvisor, each additional star-rating enhances a hotel's score. A "Superhost" badge could be perceived as a reliable indication of the host's experience and commitment and represent the quality of the place, while receiving more positive ratings always represents higher evaluations from peers; therefore, accommodations that receive many positive ratings are more attractive to potential guests (Liang, Schuckert, Law, & Chen, 2017). Based on these studies, it could be expected that a "Superhost" badge is a reliable signal of the host's credibility and the place's quality which in turn affect the number of review volume and consumer ratings. Therefore, based on the discussion, the hypotheses of this study:

H1: "Superhost" badge positively affects review volume

H2: "Superhost" badge positively affects consumer ratings

The sales advantages that hotels can obtain from a greater visibility on the Internet and on social media have a natural limit in the volume of services sold, given the capacity constraints in their number of rooms (Neirotti, Raguseo, & Paolucci, 2016). According to Tejada and Moreno's (2013) study, the best indicator for assessing a hotel's level of innovation may be the establishment's number of rooms. Molinillo, Ximénez-de-Sandoval, Fernandez-Morales, and Coca-Stefaniak's (2016) study indicated that the number of qualitative online reviews per room decreases as the number of rooms (capacity) increases. Based on the discussion, the hypotheses are:

H3: Number of bedrooms positively affects review volume

H4: Number of bedrooms positively affects consumer ratings

After comparing price, finding the product information, and reading online reviews, guests usually make a booking and subsequently post their own review of an accommodation whose owners require an additional fee for extra guests, quote a monthly price, and/or have a stricter cancellation policy (Alif, Pangaribuan, & Wulandari, 2019; Liang et al., 2017). A lenient cancellation policy could stimulate consumers' hotel booking intentions (Chen, Schwartz, & Vargas, 2011). The following hypotheses are suggested based on the above arguments.

H5: Cancellation policy positively affects review volume

H6: Cancellation policy positively affects consumer ratings

Based on Liang et al.'s (2017) study, photos can make an accommodation more attractive and increase its review volume, yet detailed information presented in listings, including a description and photos, cannot influence ratings. During product searching before making a purchase, photos can be an effective means to exhibit the products' qualities (Jin & Phua, 2014). Han, Shin, Chung, and Koo (2019) mentioned that although the price, place picture and star-rating have positive impacts on the likelihood of a purchase, the occupancy has a negative impact on it. Ert et al. (2016) found that, in the case of Airbnb, impressions that are visual-based had more impact compared with reputation. We can hypothesize that:

H7: Property photos positively affect review volume

H8: Property photos positively affect consumer ratings

Sridhar and Srinivasan (2012) found that consumers' online product ratings for hotels in Boston and Honolulu are not affected by the reviewer's membership duration. According to Ferreira (1997), the membership tenure was significantly and positively related to perception of belonging to a group of a private club. Therefore, we hypothesize:

H9: Membership duration positively affects review volume

H10: Membership duration positively affects consumer ratings

Wang and Nicolau's (2017) study on Airbnb in 33 cities found that the most affordable listings among high-priced properties were the ones that get more reviews, therefore it could be expected that rental price was determined by online review ratings. Previous studies have discovered that green-rated, eco-certified, and energy-efficient buildings have higher rental price (Miller, Spivey, & Florance, 2008; Wiley, Benefield, & Johnson, 2008; Eichholtz, Kok & Quigley, 2010). According to Nelson's (2007) work on certified and non-certified buildings, his study identified lower vacancy rates and higher rents in environmental-friendly-rated buildings. This forms the basis for the following hypotheses:

H11: Review volume positively affects rental price

H12: Consumer ratings positively affects rental price

RESEARCH METHODOLOGY

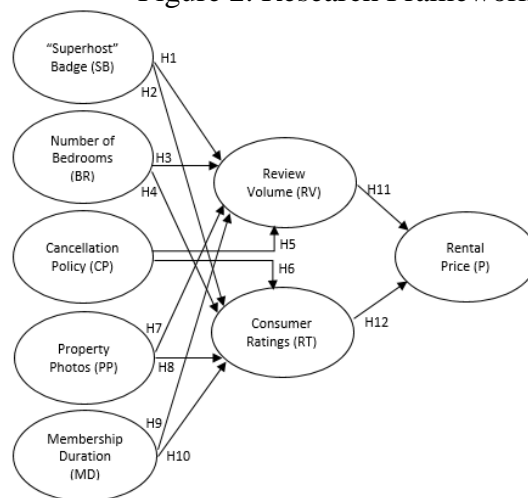
Research Approach

The main method used in this research is quantitative method with secondary data. According to Muijs (2011), quantitative method helps researchers in explaining phenomena by collecting numerical data that are analyzed using mathematical equations. While secondary data is when the information type is not specific for certain use and has been collected by others. This secondary data was collected using automated parsing method developed based on Python programming language. Therefore, this research will not perform reliability and validity test. For data processing, this study uses entire population data instead of sample data to get the most reliable result.

The secondary data was collected using a dataset of 413 Airbnb Jakarta listings over a period between January 2012 and May 2018. This study focus on retrieving Airbnb accommodation listing information’s within Jakarta area. There are two reasons on why Jakarta was chosen as the target destination. First, Jakarta had the third-largest growth rate for hotel rooms in Asia Pacific after Tokyo and Shanghai. Second, the stability of accommodation demand in Jakarta with 75% occupancy rate. This study examines the determinants of reputation variables and its relationship with rental price of accommodations in Airbnb listing. In order to do that, this research used web-crawling method based on Python programming language to get the three types of information: characteristics of listings (consisted of bedroom numbers, price of accommodation, and property photos), attributes of host (consisted of badge status and cancellation policy), and reputation of the listings (consisted of review volume, consumer ratings, and membership duration).

This study employs three empirical models on review volume (Model 1), consumer ratings (Model 2) and rental price (Model 3). Model 1 is to find the relationship between the independent variables (“Superhost” Badge, Bedroom Numbers, Cancellation Policy, Property Photos, and Membership Duration) and Review Volume as dependent variable. Model 2 is to find the relationship between the same independent variables as Model 1, while Consumer Ratings serve as the dependent variable. Model 3 is to find out whether Review Volume and Consumer Ratings affect Rental Price. The research framework is illustrated in Figure 2.

Figure 2. Research Framework



RESULT AND DISCUSSION

Data Description and Analysis Preparation

The following description explains the statistics of the variables. The owners of accommodations with “Superhost” status is 23% of the total, while those that do not carry a “Superhost” badge are 77%. For the number of bedrooms that the accommodations have, it ranges from 0 to 4, with zero usually being an apartment studio. The properties with 1 bedroom dominate the data with 64% of the total. In terms of the policy, 45% of owners employed a flexible booking rule, with 28% and 27% using moderate and strict policies, respectively. Most of the owners were willing to add extra descriptions of the accommodation to draw more guests. On average, they post 16 photos. Finally, for the duration, the average of owners’ Airbnb membership was 19 months. From the description above, it can be said that the adoption of Airbnb platform in Jakarta is still relatively at an early stage.

In order to better show the results and to ensure the accuracy of estimations, the researchers did a collinearity check. From the test, as seen in Table 1 and Table 2, all variables have VIF values of less than 10 ($VIF < 10$). This means that all variables are free from collinearity and, therefore, can proceed to regression analysis.

Table 1. Collinearity Check for Review Volume and Consumer Ratings

Variables	Review Volume		Consumer Ratings	
	Tolerance	VIF	Tolerance	VIF
“Superhost” Badge	0.923	1.083	0.923	1.083
Number of Bedrooms	0.997	1.003	0.997	1.003
Cancellation Policy	0.877	1.140	0.877	1.140
Membership Duration	0.918	1.089	0.918	1.089
Property Photos	0.834	1.199	0.834	1.199

Source: Self-Prepared

Table 2. Collinearity Check for Rental Price

Variables	Rental Price	
	Tolerance	VIF
Review Volume	0.893	1.120
Consumer Ratings	0.893	1.120

Source: Self-Prepared

Estimation Results

Multiple regression tests were used to process the collected data; which results can be seen in Table 3. In model 1, the linear relationship is strong as seen from the result of R-squared, which is 0.319, illustrating that 31.9% of Review Volume (RV) can be described through the five factors of SB (“Superhost” Badge), BR (Bedrooms), CP (Cancellation Policy), PP (Property Photos), and MD (Membership Duration). For model 2 and model 3, the linear relationship is not as strong, because their R-squared values are 2.2% and 0.03% respectively.

Table 3. Multi Regression Tests

Model	R	R-Square	Adjusted R-Square
1	0.565	0.319	0.310
2	0.147	0.022	0.012
3	0.058	0.003	0.002

Source: Self-Prepared

Next, to investigate the influence of “Superhost” badge, number of bedrooms, cancellation policy, property photos, membership duration, review volume, consumer ratings, and rental price on review volume, consumer ratings, and rental price, two multiple regressions and one simple regression analyses were carried out, with the following three regression models constructed.

Regression Model 1: $Y_1 = a_0 + a_1(X_1) + a_2(X_2) + a_3(X_3) + a_4(X_4) + a_5(X_5) + e$, where Y_1 , X_1 , X_2 , X_3 , X_4 , and X_5 stand for review volume, “Superhost” badge, number of bedrooms, cancellation policy, property photos, and membership duration, respectively.

Regression Model 2: $Y_2 = a_0 + a_1(X_1) + a_2(X_2) + a_3(X_3) + a_4(X_4) + a_5(X_5) + e$, where Y_2 , X_1 , X_2 , X_3 , X_4 , and X_5 stand for consumer ratings, “Superhost” badge, number of bedrooms, cancellation policy, property photos, and membership duration, respectively.

Regression Model 3: $Z = a_0 + a_1(Y_1) + a_2(Y_2) + e$, where Z , Y_1 , and Y_2 stand for rental price, review volume, and consumer ratings, respectively.

The F-test result for Model 1 (see Table 4) shows that the Sig. value is 0.000 which is less than alpha (<0.05). When Sig. value is less than alpha, it means that Model 1 is significant. Likewise, Model 2 (see Table 5) is also significant since the Sig. value of 0.009 is less than alpha (<0.05). However, the result for model 3 (see Table 6) with Sig. value of 0.507 shows that this model does not fit in explaining the dependent variable. The result of this test is aligned with multiple regression result, in which review volume and consumer ratings are not sufficient in explaining the rental price model.

Table 4. ANOVA (Model 1)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	76275.562	5	15255.112	38.081	0.000
Residual	163044.293	407	400.600		
Total	239319.855	412			

Source: Self-Prepared

Table 5. ANOVA (Model 2)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	866600.058	5	173320011.600	3.114	0.009
Residual	22652858.210	407	55658128.270		
Total	23519458.260	412			

Source: Self-Prepared

Table 6. ANOVA (Model 3)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	83860446.420	2	41930223.210	0.680	0.507
Residual	25264145370.000	410	61619866.740		
Total	25348005810.000	412			

Source: Self-Prepared

In Model 1, Superhost Badge and Membership Duration had p -values of less than the value of alpha ($0.000 < 0.05$). Table 7 shows that the two variables are significant, therefore the null hypothesis (H_0) should be rejected and H_1 accepted. The p -values of the other 3 variables Bedrooms, Cancellation Policy, and Property Photos are above the value of alpha, thus they are not significant. This result is consistent with previous study by Liang, et al. (2015) whose study found the significant relationship between Superhost Badge and Membership Duration towards Review Volume.

To earn and retain Superhost Badge, property owners need to engage with the guests, including keeping the lines of communication open starting from the booking process to checking out. According to Cavusoglu, Li, and Huang (2015), badge system is an effective gamification designed to increase user engagement. In this case, engagement will likely to lead guests to post reviews about their experience when using a rental accommodation from Airbnb.

Membership Duration also significantly influences the numbers of review volume. In peer to peer rental platform, the challenges that both guests and hosts are facing is trust. In order to book a room in Airbnb, a guest needs to make sure whether the host is trustworthy. Thus, trust plays a significant role in converting attention into actual booking request (Hawlitschek, Teubner, & Weinhardt, 2016).

In model 2, Membership Duration is the only variable that is significant, judging from its p -value less than the value of alpha (see Table 7). The test result shows that the variable is significant and therefore the null hypothesis (H_0) should be rejected and H_1 accepted. Moreover, the result shows that Membership Duration significantly influenced the Consumer Ratings of an accommodation.

At Airbnb, by the time a user is registered, their information will be available on the platform. Membership Duration, in peer to peer platform, is often closely illustrated to profile information, including name and photo, to represent the user's reputation. Information asymmetries arise because hosts and clients typically know little about each other, therefore, a distinguishing feature of reviews on peer-to-peer marketplaces like Airbnb, is their only source of reputation (Zervas, Proserpio & Byers, 2015).

For model 3, the test result in Table 7 shows that none of the independent variables has p -value less than the value of alpha. Therefore, the null hypothesis (H_0) should be accepted, and H_1 rejected. This result concludes that the variable of Review Volume and Consumer Ratings cannot be used as Rental Price determinants.

Table 7. Coefficients

Variables	Review Volume (Model 1)	Consumer Ratings (Model 2)	Rental Price (Model 3)
<i>Constant</i>	0.695 (0.253)	-595.564 (-0.582)	442976.378 (29.512)
Review Volume	-	-	465.687 (0.867)
Consumer Ratings	-	-	-1.749 (-1.021)
“Superhost” Badge	14.273* (5.925)	-1522.893 (-1.696)	-
Number of Bedrooms	-1.726 (-1.586)	-220.297 (-0.543)	-
Cancellation Policy	2.155** (1.914)	709.644** (1.691)	-
Property Photos	0.112** (1.436)	18.661 (0.641)	-
Membership Duration	0.512* (8.614)	55.965* (2.527)	-

*Significant at 95% confidence level

**Significant at 90% confidence level

CONCLUSION

This research has two sets of findings. The first is related to the factors influencing Review Volume and Consumer Ratings. The five variables that are related with characteristics of listing, attributes of host, and reputation include Superhost Badge, Bedroom, Cancellation Policy, Property Photos, and Membership Duration. From the Review Volume model empirical result, it showed that Superhost Badge and Membership Duration have positive influence. Therefore, when these attributes increase, Review Volume would likely increase. Among all the predictors, Membership Duration has the highest standard coefficient beta, meaning that this variable has the strongest effect compared to the other variable in affecting Review Volume. For the Consumer Ratings model, the result indicated that only one variable was significant (Membership Duration). The result implies that a host with longer duration would likely receive higher consumer rating due to their reputation and experience in welcoming guest. This finding strengthens the existing evidence from prior research from Liang, Schuckert, Law and Chen (2017).

The other set of finding focuses on the Rental Price model. In this model, the researchers expected that Review Volume and Consumer Ratings of accommodation would influence Rental Price. However, the hypothesis could not be validated by the regression result. Thus, both Review Volume and Consumer Ratings do not have influence on Rental Price of an accommodation. This finding was not supportive of previous studies (Wang & Nicolau, 2017; Teubner, Dann, & Hawlitscheck, 2017).

According to the result, the factor of Superhost Badge positively influences Review Volume and Consumer Ratings. However, one of the challenging tasks for the host is to have extra efforts in order to keep this badge, e.g. discussions about booking process through emails between hosts and potential guests. Other than that, a host needs

to pay attention to Membership Duration closely because Airbnb actively seeks to create a community of long-term engagement, thus it may be beneficial for the reputation of the host (Gebbia, 2016). Hence, being a well-known member of the public, the Membership Duration could have an effect on the rental price of a listing.

This study has certain limitation in which it only focuses on the listings in one city. For future research, it is suggested to expand more samples by including more locations. Also, further study should explore more factors that influence review volume and consumer ratings of an accommodation in order to improve the understanding and strengthen the research results.

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