# Understanding the Influence of Product Recommendation and User Generated Content on Customer Loyalty of Beauty-Techs in Indonesia

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**Abstract.** Social Shopping Community (SSC) is an online shopping platform to search, share, recommend, rate, and buy products, including Beauty-Tech's products. SSC increases customer loyalty through the profound factors: Online Product Recommendation (OPR), Online Product Brokering (OPB), and User Generated Content (UGC). Unfortunately, previous research was limited to observing one company's SSC platform only, so it is unclear whether the factors that can increase customer loyalty through the SSC platform apply to other beauty-tech companies. Therefore, this study uses SEM-PLS to examine how OPR affects OPB and customer loyalty through UGC. The findings reveal that a high level of user-generated content (UGC) moderates the relationship between customer loyalty and decision-making quality significantly. The OPR's enabler factor that substantially influences OPB is self-reference; meanwhile, information overload is the inhibitor factor that has a more decisive influence. The research results above apply to various SSC platforms in Indonesia because there are no significant statistical differences between Indonesia's top four beauty tech startup companies.

**Keywords:** Social Shopping Community · Beauty-Tech · Customer Loyalty · Online Product Recommendation

## 1 Introduction

Beauty Tech companies offer products and services such as cosmetology brands, cosmetology content platforms, product aggregators, platforms to promote online sales of cosmetology products, and cosmetology salon management solutions. In Indonesia, Beauty tech as an E-Commerce is considered as one of the most dynamic sectors in Southeast Asia, with more than four times growth since 2015 [1]. Beauty-tech is currently competing with its competitors in retaining customers by offering a variety of products and affordable access for domestic consumers through the use of technology to create digital business services [2]. One of the digital business strategies currently being carried out by top beauty-tech startups such as PT Social Bella by Sociolla (SOCO), All Young, Female Daily and Beautylish is to develop a Social Shopping Community.


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The Social Shopping Community (SSC) represents a website selling and promoting products through online channels, and it connects consumers. So, SSC can be used to search, share, recommend, rate, and buy products [3]. An example of the SSC's key feature is the personalization provided by SOCO companies to increase product sales through the Online Product Recommendation (OPR) feature, which is personalized based on customer preferences [4]. OPR, as one of the key features in SSC, is a significant main reason for increasing customer loyalty. It allows customers to customize the search for products or services according to their preferences to minimize the time and process of searching for products. In addition, OPR also increases the possibility of customers buying the most needed products and improves the quality of customer decision-making, which will increase customer loyalty [5]. Another study supports that the suitability between consumer preferences can describe OPR personalization and product recommendations or content displayed [6].

Besides OPR, another factor that also influences SSC customer loyalty is the *User Generated Content* (UGC) level. It is a feature in SSC that contains various media such as photos, videos, and texts created and circulated by users and can be enjoyed by fellow users [7]. In relation to SSC, customers or users can post media content which is usually a review of a product that has been purchased. This media content is consumed by other users and can also be a marketing tool for related products. Research proves that by paying attention, responding to posted content, and providing solutions by brands and other users will indirectly increase the relationship and trust between the user community, which can also have an impact on improving the level of loyalty of these users to the brand being reviewed [8].

The relationship between UGC and OPR can be seen from how OPR plays an important role in making customers interested in buying a product that suits customer preferences and UGC, which delivers the customer experience when they have used the product. These two factors will undoubtedly provide interaction in the SSC community so that the relationship between brands with their customers and potential customers can be well established.

Several findings from previous research [5] are used as references for this paper. First, the *Product Recommendation Strategy* provides the making for *Customer Loyalty* increase by also improving the efficiency of intermediary products purchased online. *Self-Reference Content* should also be regarded and looked at as an important piece in SSC design. A considerable number of retailers have followed the Self-Reference strategy and have reaped the rewards through the Customer Loyalty increase. In addition, the UGC (*User Generated Content*) level plays an important role in the context of social shopping. This shows that consumer involvement is very important in value creation networks and can effectively increase customer loyalty. Finally, a user-friendly website and excellent customer service improve the productivity of online product intermediaries greatly by reducing user information retrieval costs and improving the quality of their decision-making.

Previous studies discussing OPR, UGC, and SSC had some limitations where the research model studied only purchase intentions rather than the behaviour of actual buyers [9]. Another disadvantage is the limitation on one SSC platform, so that the research results are too specific and cannot be generalized to every SSC [5]. Therefore,

this study focuses on evaluating user behaviour on one SSC and several SSCs to compare whether the results obtained are the same as previous studies. Moreover, this study is also specific to the behaviour of SSC customers for beauty tech in Indonesia, especially in Java as the centre of fashion.

To have a comparable result with previous research, we also used the Structural Equation Model – Partial Least Quare (SEM-PLS) method to analyse what SSC factors affect customer loyalty from beauty tech. SEM-PLS as a suitable method for conducting *confirmatory theory testing* [10] will answer the research questions: 1) Do enablers and exhibitors influence OPR on beauty tech in Indonesia? 2) How does OPB efficiency affect SSC customer loyalty in Indonesia? 3) Does the UGC level also affect the relationship between the loyalty of customer and the efficiency of online product brokering? 4) Is there a difference in behaviour between one SSC to another?

## 2 Overview of Beauty Tech and Social Shopping Community

The growth of market competition makes companies experience difficulties in acquiring and retaining existing customers. It motivates the company to retain customer loyalty [11]) which plays an important indicator that shows the success of a business, one of which is in beauty technology [12, 13]. Therefore, Beauty tech companies must perform evaluations related to affecting aspects [14, 15]. Previous research has shown that understanding the factors that influence customer loyalty is essential for a company's sustainability to survive in a highly competitive environment [16].

Loyal customers can have a positive impact on the company. If a company incorporates the social shopping commerce trends into its business process, the loyalty of customer can benefit the company's website because customers are more likely to use it in the future and suggest it to others [17]. Along with the increase in social media users, the social shopping community (SSC) is present as a forum to assist consumers in shopping for products while interacting with fellow users on a website [3]. One of the services that can support the achievement of customer loyalty in SSC is the User Generated Content (UGC) feature. Beauty tech users can create content on the website regarding their opinions and experiences in using the product[18]. According to [5], a high UGC level will increase the customer loyalty on SSC since the customers are expecting that UGC will be able to meet their needs in socializing and gaining decent feedbacks from people. A high UGC level demonstrates the interactions occurring between customers on SSC[19]. Referring to the analysis on Similarweb, the highest SSC trend on Indonesia Beauty Tech is hold by Female Daily website with 3.7 million of total of visitors and 58.10% of bounce rate. Following Female Daily, SOCO website is visited by 929,8 thousands visitors with 65.42% of bounce rate. Next up is Beauylish website with 2.79 million of total visitors and 55.69% of bounce rate. The last one is All Young website holds 9.49 thousands visitors with bounce rate of 91.46%[20].

Female Daily is one of SSC Beauty Techs in Indonesia who succeeded in attaining the title of The Most Popular Forum in 2016 through their basic engagement [21]. Besides providing the feature to shop one product, Female Daily's customers are given the access to create their own product content on the provided website. On Female Daily's Member feature, the user will be able to review one product and join in to certain available forums

created by other users (Female Daily, 2021). User engagement on the feature is highly considered as the form of loyalty on Female Daily since through that feature, they have established a connection and interaction among users [23]. Besides Female Daily, SOCO also helps to provide the feature where the users are able to generate products according to their personal preference and interest. SOCO is a collaboration platform of Sociolla and Beauty Journal. On SOCO, the customers are able to shop various products like what they have experienced on other e-commerce in general. Moreover, SOCO users may as well contribute to SOCO user community by creating reviews, articles, or videos related to SOCO products [4]. After reviewing the product, SOCO and Female Daily customers will gain several points that can be exchanged with product discount. Unlike Female Daily and SOCO, Beautylish and All Young do not provide the users with the same features that help them to interact with each other yet both websites do provide the review feature that will make the customers possible to gain related information about the products they have previously purchased (Beautylish, 2021; All Young, 2021). The feature will also help other users to get better products through the available reviews.

The research on factors affecting customer loyalty was conducted by [26]. The result shows that Personalized Product Recommendations (PPR) adjusted to the preference and interest of the user will increase the user shopping experience. Unfortunately, the research is only limited to one product category (DVD) and is only conducted on one website (Amazon.com). On the research, [26] control all features on online product brokering efficiency causing the research result cannot be generalised to the other websites. Therefore, an improvement is necessary by conducting research on different websites [5].

## 3 Research Model

The research model presented in this work (Fig. 1) is based on the research of [5], in which the model was utilized to conduct research on one of China's most popular SSC websites (Mogujie). In this study, four prominent SSC Beauty Techs in Indonesia (Female Daily, SOCO, Beautylish and All-Young) are compared.

[5] Further develops on the preceding model by separating OPR quality into enablers (vividness and self-reference) and inhibitors (information overload and deceptiveness). OPR quality then impact loyalty of customer via online product brokering (OPB) efficiency, which is quantified by decision-making quality, product screening costs, and product evaluation costs. The UGC level was also used as a moderator variable to determine if a change had occurred and how it affected OPB efficiency on loyalty of customer (a detailed explanation of each variable can be seen in Appendix 1). However, it has limitations since only examining one SSC, so the study results cannot be generalized to other SSCs. Therefore, this research will be developed by examining several SSCs in Indonesia and comparing the results obtained. The research model [5] was in accordance with the case study of SSC in Indonesia since it focused not only on product sales but also on socialization among fellow consumers. This is evidenced by the UGC feature on SSC provided by several popular beauty techs in Indonesia, namely Female Daily, SOCO, Beautylish, and All-Young. Furthermore, the variables in online product brokering efficiency are in line with SSC's efforts to increase loyalty of customer

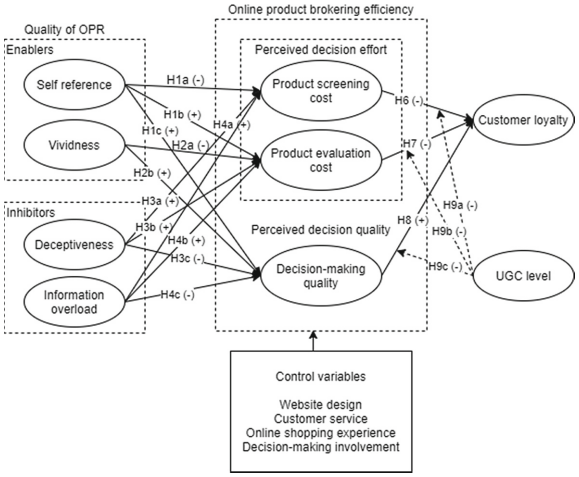


**Fig. 1.** Research Model [5]

through the three beauty techs by facilitating consumer purchases to be efficient.[4, 21, 24, 25].

## 4 Methods

### 4.1 Survey Instrument

The questionnaire was developed based on [5], consisting of 39 questions with answers using a 7 point Likert scale with scale of 1 means "strongly disagree" and 7 means "strongly agree" (strongly agree). The questions are in English, although the questionnaire was delivered in Indonesian during implementation according to the respondent's native language.

### 4.2 Data Collection

Questionnaires were distributed online through various social media such as WhatsApp, Line, Instagram, and Twitter.. Respondents' criteria were set as follows: 1) Fashion customers use SOCO, Female Daily, Beautylish, and All Young applications, 2) Age between 17–39 years old, 3) No limitation on job, 4) Domiciled in Java Island, considering the different fashion or makeup preferences among different islands in Indonesia (Java Island can be said to be the center of fashion and cosmetics).There were 369 respondents accepted with descriptive statistics, as seen in Table 1.

The most dominant respondents were women, as many as 357 or 96.75% of the total respondents. Most respondents are domiciled in East Java (46.43%), with the highest age range being 17–22 (74.53%) of the total respondents. 71.54% of respondents are students, with most respondents make transactions once a month (36.04%). The last transaction was dominated by SSC's customers who bought products in 1–3 months ago.

**Table 1.** Descriptive Statistical Analysis Result of Respondent

| Category | Description | Number | Percentage |
|---|---|---|---|
| Gender | Men | 12 | 3,25% |
| | Women | 357 | 96,75% |
| Respondents' Domiciles | Jawa Barat | 71 | 19,24% |
| | Jawa Timur | 171 | 46,34% |
| | Jawa Tengah | 21 | 5,69% |
| | DKI Jakarta | 70 | 18,97% |
| | DI Yogyakarta | 5 | 1,36% |
| | Banten | 29 | 7,86% |
| | Others | 2 | 0,54% |
| Respondents' Ages | 17–22 Years Old | 275 | 74,53% |
| | 23–28 Years Old | 82 | 22,22% |
| | 29–39 Years Old | 12 | 3,25% |
| Respondents' Occupation | Student/University Student | 264 | 71,54% |
| | Government employees | 6 | 1,63% |
| | Private employees | 65 | 17,62% |
| | Entrepreneur | 13 | 3,52% |
| | Housewife | 12 | 3,25% |
| | *Freelance* | 2 | 0,54% |
| | Teacher | 3 | 0,81% |
| | *Laboratories* | 1 | 0,27% |
| | *Job Seeker* | 3 | 0,81% |
| Frequence of Transaction per month | < 1 time | 103 | 27,91% |
| | 1 time | 133 | 36,04% |
| | 2–3 times | 17 | 4,61% |
| | 4–10 times | 8 | 2,17% |
| | > 10 times | 2 | 0,54% |
| Last transaction | Less than 1 month ago | 106 | 28,73% |
| | 1–3 months ago | 155 | 42,01% |
| | 4–6 months ago | 44 | 11,92% |
| | More than 6 months ago | 64 | 17,34% |

### 4.3 Selection of Methods and Software

Partial Least Squares - Structural Equation Modeling (PLS_SEM) is then used to analyze the data, considering this method does not strict on the number and distribution of data

samples and the distribution of residuals. PLS-SEM can also test large and quite complex models. The software used to describe and test the model are Smart PLS.

### 4.4 Measurement Model (Outer) Evaluation

In PLS, the model is evaluated in two stages: the measurement model (outer model) and the structural model (inner model) [10]. The constructor-forming indicators' reliability and validity are assessed using a measurement model. The relationship developed on the measurement model in this study is reflective and is evaluated through *convergent validity* [27], *discriminant validity* [28], and *composite reliability* [10].

In all indicator blocks, the *composite reliability* value is more than 0.6, as shown in Table 2, then it meets the minimum value recommended by [10, 29]. Another way to measure the consistency of the indicator block in the reflective measurement model is to look at the value of the *Average Variance Extracted (AVE)* must be greater than 0.5 [30]. Thus, AVE in Table 2 strengthens indicators' consistency.

The validity of the instrument was tested using a discriminant validity test, which looked at cross-loading between the indicator and its latent variable. When compared to loading factors in different constructs, an indicator is considered valid if it corresponds with the highest latent variable (loading factor) in the intended construct (variable) [30]. The indicator can be considered valid because it has the highest loading factor in the intended construct, as shown in Appendix 2 It demonstrates that the latent variable outperforms other latent variables in predicting the needle in their block..

**Table 2.** Construct Reliability and Validity Model

| | Cronbach's Alpha | Composite Reliability | Average Variance Extracted (AVE) |
|---|---|---|---|
| Customer Loyality | 0.844 | 0.906 | 0.763 |
| Customer Service | 0.863 | 0.916 | 0.785 |
| Dec Making Invol | 0.736 | 0.850 | 0.653 |
| Dec Making Quality | 0.800 | 0.883 | 0.715 |
| Deceptiveness | 0.752 | 0.845 | 0.580 |
| Information Overloaded | 0.857 | 0.912 | 0.776 |
| Product Eval Cost | 0.887 | 0.930 | 0.816 |
| Product Screen Cost | 0.727 | 0.846 | 0.651 |
| Self Reference | 0.749 | 0.840 | 0.568 |
| UGL | 0.829 | 0.896 | 0.743 |
| Vividness | 0.706 | 0.833 | 0.626 |
| Website Design | 0.715 | 0.815 | 0.528 |

### 4.5 Structural Model (Inner) Evaluation

Structural model evaluation was carried out to measure the level of *Goodness of Fit* (GOF). Based on the results of structural model testing, $R_{Customerloyalty}{}^2 = 17.7\%$, showing that the goodness of forming the *customer loyalty* model can be explained by 17.7%, by product screening cost, decision-making quality,UGC, product evaluation cost, and the relationship between UGC and product screening cost, product evaluation cost, decision-making quality, while 82.3% by other variables outside the research. The score of $R_{Decmakingquality}{}^2 = 15.4\%$, $R_{Productevalcost}{}^2 = 20.1\%$, and $R_{Productscreencost}{}^2 = 21.6\%$ indicates that self-reference, vividness, deception, and information overload, as well as the three control factors, may explain 15.4%, 20.1%, and 21.6% of the goodness of decision-making quality, product evaluation cost, and product screening cost, respectively.

### 4.6 Hypothesis Testing

The following evaluation is done through hypothesis testing using the PLS method. This method does not assume that the data is normally distributed, so resampling with *bootstrapping* is used [30]. *Bootstrapping* is iterated 500 times and results 500 valid data after the resampling process. The list of hypotheses for the outer and inner models tested in this paper can be seen in Appendix 3 and Appendix 4.

## 5 Result

### 5.1 Hypothesis Testing Result

The test yields influence coefficients between the indicator and the latent variable and path coefficient, which shows the relationship between the latent variables (**Fig. 2**). Relationship value between latent variables are marked with $^{ns}$ which means it is not significant, * significant at the significance level $\alpha = 0.05$, ** significant at the significance level $\alpha = 0.01$, and *** significant at the significance level $\alpha = 0.001$.

There are two aspects studied in the quality of OPR, which are enablers that consists of vividness and self-reference and inhibitors that consists of information overload and deceptiveness. The enablers aspect presents that self-reference has a negative effect that is significant on product screening costs while also positively impacts the decision-making quality. Although, Self-reference itself does not have a substantial impact on product evaluation costs. Based on this analysis, H1a and H1c were accepted, while H1b, H2a, and H2b were rejected. In the aspect of inhibitors, information overload and deceptiveness seem to affect the three online product brokering variables significantly while also positively affecting product screening costs and product evaluation costs and negatively affecting the decision-making quality. Thus, H3a, H3b, H3c, H4a, H4b, and H4c are accepted.Furthermore, Fig. 2 compares the strength of the influence of enablers and inhibitors on the efficiency of OPB (product evaluation cost, product screening cost and decision-making quality). Deceptiveness and information overload have a more substantial effect ($\beta = 0.192, = 0.344$) on product screening cost than self-reference ($\beta = -0.100$). In addition, deceptiveness and information overload also have a more

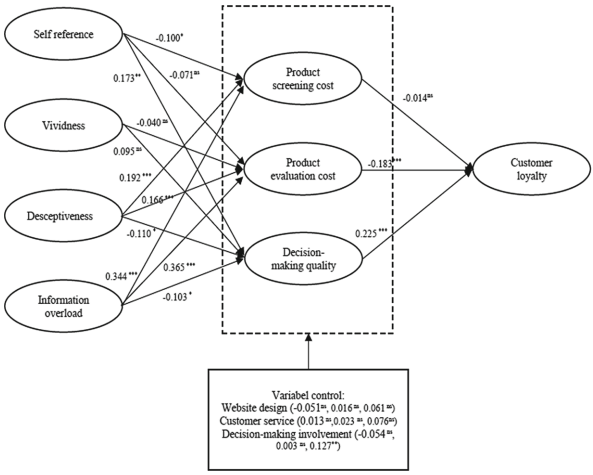


**Fig. 2.** Path Comparison on Hypothesis Testing

significant impact (β = 0.166, = 0.365) on product evaluation costs than self-reference (β = −0.071) and vividness (β = −0.040). Based on the result, it could be concluded that H5a, H5b, H5c, and H5d were accepted. However, H5e and H5f were rejected because self-reference has a bigger influence (β = −0.173) on decision making quality than deceptiveness and information overload (β = −0.110, = −0.103).

## 5.2 Moderating Effect with Interaction Test

Based on the three models that have been carried out, namely model 1 (without the UGC variable), model 2 (with the addition of the UGC variable as moderation) and model 3 (with the addition of the UGC variable and its interaction as moderating), the summarization of the results is presented on Table 3.

**Table 3.** Summary of Moderation Table

| Variable | Dependent Variable: Customer loyalty | | |
|---|---|---|---|
| | Model 1 | Model 2 | Model 3 |
| **Independent Variable** | | | |
| Product screening cost | -0.014$^{ns}$ | -0.048$^{ns}$ | -0.053$^{ns}$ |
| Product evaluation cost | -0.183$^{***}$ | -0.198$^{***}$ | -0.221$^{***}$ |
| Decision-making quality | 0.225$^{***}$ | 0.187$^{***}$ | 0.188$^{**}$ |
| Moderating variable | | | |
| UGC | | 0.223$^{***}$ | 0.288$^{***}$ |
| **Interaction term** | | | |

(*continued*)

**Table 3.** (*continued*)

| Variable | Dependent Variable: Customer loyalty | | |
|---|---|---|---|
| | Model 1 | Model 2 | Model 3 |
| UGC*Product screening cost | | | $0.048^{ns}$ |
| UGC*Product evaluation cost | | | $0.099^{ns}$ |
| UGC*Decision making quality | | | $0.143^{*}$ |
| $R^2$ | 10.5% | 15.3% | 17.7% |
| $\Delta R^2$ | 0 | 4.8% | 7.2% |

In addition, Table 3 also shows that the UGC moderating variable moderates the decision-making quality and customer loyalty's relationship (p-value = 0.143), so H9c is accepted. Since decision-making quality and customer loyalty has found a significant relationship between them, UGC and customer loyalty, as well as the interaction between UGC and decision-making quality to customer loyalty, the quasi moderation is formed. In contrast, UGC does not significantly moderate the relationship between Product Screening Cost and Product Evaluation Cost on Customer Loyalty, so H9a and H9b are rejected. However, the direct relationship between UGC and customer loyalty is significant. In this case, UGC can be considered as a potential predictor for customer loyalty.

Although UGC Level has no significant effect, the addition of the UGC variable without interaction increases the R2 value by 4.8%. Meanwhile, the addition of the UGC variable and its interaction with the three independent variables increases the R2 value by 7.2%, showing that value of the structural model is getting better. Thus, further analysis of UGC and its interaction's influence on the dependent variable of customer loyalty is essential.

To do that, we performed a subgroup analysis[31] by splitting up the sample into two groups that referenced the UGC level (low and high) as shown in Fig. 3 a & b. Product screening costs both at high UGC level, and low UGC level have no significant effect on customer loyalty, following the previous hypothesis. For both high and low levels of UGC, product evaluation costs have a similar significant negative effect on customer loyalty. Meanwhile, at a high UGC level, decision-making quality positively influences customer loyalty but has no effect when the UGC level is low.

### 5.3 Customer Behavior Analysis Based on the SSC Platform Used

As previously explained, the SSC platforms used by beauty product customers in Indonesia are SOCO, Female Daily, Beautylish, and All Young. It turns out that customers may use more than one SSC platform before finally deciding to buy a product (Table 4). To find out whether there are differences or similarities between customer behavior of beauty goods on various types of SSC platforms, the subsequent analysis performed is nonparametric Kruskal Wallis[32].

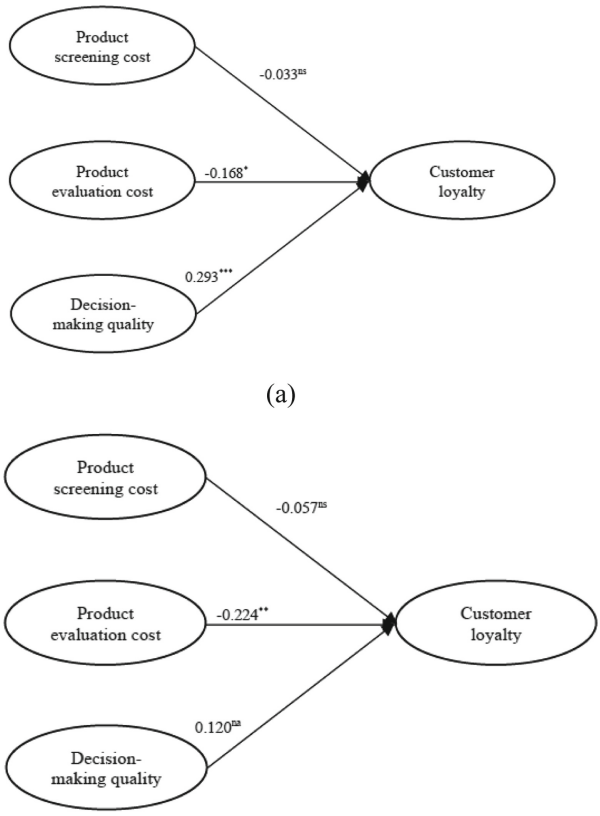


**Fig. 3.** Subgroup Analysis based on UGC Level (a) High UGC Level Model, (b) Low UGC Level Model

**Table 4.** Distribution of Customers over Various Beauty Tech's SSC Platform

| Beauty Tech | Frequency | Percentage |
|---|---|---|
| Soco | 315 | 85.4% |
| Female Daily | 11 | 3.0% |
| Beautylish | 11 | 3.0% |
| All Young | 9 | 2.4% |
| Soco & Beautylish | 2 | 0.5% |
| Beautylish & AllYoung | 1 | 0.3% |

(*continued*)

**Table 4.** (*continued*)

| Beauty Tech | Frequency | Percentage |
|---|---|---|
| Female Daily & AllYoung | 4 | 1.1% |
| Female Daily & Beautylish | 10 | 2.7% |
| Soco, Beautylish & AllYoung | 4 | 1.1% |
| Female Daily, Beautylish, and AllYoung | 2 | 0.5% |
| | 369 | 100.0% |

**Table 5.** Theoritical Implications

| Hypothesis | Support the hypothesis? | Previous Literature | Empirical relationship based on previous study | Difference result between previous literature and this study |
|---|---|---|---|---|
| H1a : Self Reference to Product Screening Cost | Yes | [5, 6] | High-priority content is more detailed than low-priority content. | No difference |
| H1b : Self Reference to Product Evaluation Cost | No | [5, 36] | Users remember self-related web content faster and more accurately than non-self-related web content. | No difference |
| H1c : Self Reference to Decision Making Quality | Yes | | Users exposure to self-related web content spend less time making a decision and searching for information than they would if they were exposed to non-self-related web content | No difference |

(*continued*)

**Table 5.** (*continued*)

| Hypothesis | Support the hypothesis? | Previous Literature | Empirical relationship based on previous study | Difference result between previous literature and this study |
|---|---|---|---|---|
| H2a Vividness to Product Evaluation Cost | No | [5, 37] | Increased vividness will enhance perceived diagnosticity. | In fact, product evaluation cost tends to be affected significantly by information overload and deceptiveness only. |
| H2b: Vividness to Decision Making Quality | No | | Increased vividness in product presentations will enhance consumers' shopping enjoyment. | |
| H3a: Deceptiveness to Product Screening Cost | Yes | [5, 38] | The higher perceived deception of a website adversely affects the perceived quality of the seller. | No difference |
| H3b : Deceptiveness to Product Evaluation Cost | Yes | | | No difference |
| H3c: Deceptiveness to Decision-making Quality | Yes | | Quality of perceived product is adversely affected by the higher perceived deception of the website | No difference |
| H4a : Information overload to Product Screening Cost | Yes | [5, 39] | Information control relates to the attitudes of costumers,whether they are satisfied with the website or not, and how customers are involved in website journey. | No difference |
| H4b : Information overload to Product Evaluation Cost | | | | |
| H4c : Information overload to Decision-Making quality | Yes | [5, 40] | Consumers' subjective attitudes towards purchasing decisions is correlated with too many perceived information | No difference |

(*continued*)

**Table 5.** (*continued*)

| Hypothesis | Support the hypothesis? | Previous Literature | Empirical relationship based on previous study | Difference result between previous literature and this study |
|---|---|---|---|---|
| H5a and H5b : Inhibitors vs Enablers to Product Screening Cost | Yes | Not Applicable | Not Applicable | No difference |
| H5c and H5d : Inhibitors vs Enablers to Product Evaluation Cost | Yes | Not Applicable | Not Applicable | No difference |
| H5e and H5f : Inhibitors vs Enablers to Decision-making Quality | Partially | Not Applicable | Not Applicable | No difference |
| H6 : Product Screening Cost to Customer Loyalty | No | [5, 37] | Product screening cost → Repurchase Intention | Based on previous literature, product screening cost has a negative association with repurchase intention, which is heavily linked with customer loyalty. In fact, customer loyalty depends more on the quality of decisions than on the cost of product screening. |

(*continued*)

**Table 5.** (*continued*)

| Hypothesis | Support the hypothesis? | Previous Literature | Empirical relationship based on previous study | Difference result between previous literature and this study |
|---|---|---|---|---|
| H7 : Product Evaluation Cost to Customer Loyalty | Yes | [26, 41] | The cost of product evaluation correlates with intention to repurchase | Based on previous literature, product evaluation cost has no significant impact towards repurchase intention, which is heavily linked with customer loyalty. However, current research shows that the low cost of product evaluation has a positive effect on Customer Loyalty No difference |
| H8 : Decision Making Quality to Customer Loyalty | Yes | | The quality of making the decision associates with intention to repurchase | |
| H9a UGC Level X : Product Screening Cost to Customer Loyalty | No | | Perceived joy leads to unperceived decision-making efforts | Customer does not consider production screening cost as a serious problem since product screening is a must to get any product, no matter the product or UGC level is. It is absolutely support customer loyalty. |
| H9b UGC Level X Product Evaluation Cost to Customer Loyalty | No | | | UGC Level, will not affect customer efforts when evaluating products so that it will not also affect customer loyalty. |

(*continued*)

**Table 5.** (*continued*)

| Hypothesis | Support the hypothesis? | Previous Literature | Empirical relationship based on previous study | Difference result between previous literature and this study |
|---|---|---|---|---|
| H9c : UGC Level X Quality of Decision Making to Customer Loyalty | Yes | | Perceived joy leads to higher perceived quality of decision making | No difference |

The result is that with a significance level of (α) 5%, there is no significant difference in *customer loyalty* between *beauty tech* groups with one another. It is indicated by Chi-square = 4.65, while Asym. Sig = 0.941. So > α.

## 6 Discussion

Because all the indicators composing the latent variables in this study were equally valid and reliable, the evaluation of the measurement model in this research (outer model) was not different from the earlier research conducted by. However, there are various hypotheses that have differing outcomes from past research in the measuring of the structural model (inner model). From a total of 23 hypotheses, there are 15 hypotheses supported in this study.

With reference to moderation test results, the interaction between decision-making quality and UGC has a positive impact on customer loyalty, especially at high UGC levels. Notwithstanding, it becomes insignificant when the UGC level is low or if the customer does not engage in SSC content enough. This means that the quality of good decision-making will increase customer loyalty if it is supported by the high involvement of users of various SSC platforms in creating content (such as product reviews that are manifested in the form of text, videos, and images). It is in line with previous research in which consumers seek advice, gather information, and make higher quality purchasing decisions on SSCs with high UGC levels.

A positive relationship between self-reference and product evaluation costs is not supported. The plausible reason is that Indonesian SSC consumers feel that the presence of self-reference tends to have a strong influence on memory, judgment, and behavior. Thus, it allows consumers to remember information better and speed up the evaluation process. In addition, similar to, the negative relationship between vividness and product evaluation cost is also not supported in this study since consumers feel that the clarity and completeness of relevant and detailed information are essential for making decisions. Hence, the length of time needed to evaluate the product is not a problem. In addition, according to the Elaboration Likelihood Model (ELM), consumers will take distinct routes between peripheral and central routes. At a high level of elaboration, consumers tend to take the main way to process information carefully.

The relationship between product screening cost and customer loyalty is also not supported in this study. SSC consumers in Indonesia feel that increasing efficiency in product search does not significantly affect their adherence to SSC. To get more profound results related to these findings, an additional analysis was carried out using the moderating variable UGC level and segmenting all of the available samples based on the UGC level (low and high). UGC level and product screening cost interaction did not prove significant in this study. In groups with high and low UGC levels, product screening costs still have no significant effect on customer loyalty.

Meanwhile, inefficient and even excessive efforts in conducting product evaluations have weakened customer loyalty on the SSC platform provided by beauty tech in Indonesia. It means if the SSC platform does not offer product evaluation facilities through comprehensive information, it will make customers spend more effort in finding their knowledge with possibly a longer process, thus weakening customer loyalty. This condition tends to occur when the UGC is low because customer product evaluation efforts are more difficult when there is no opinion assistance (e.g. reviews of beauty products) from other customers [33]. Thus, customers will look for alternative solutions from other SSC platforms.

### 6.1 Theoretical Implication

In contrast, the previous studies [5] only examined one type of SSC in China, this study examined four different SSC platforms from the Beautytech company. Further comparison is seen in Table 5.

### 6.2 Practical Implication

This paper indicates several vital factors that affect OPB efficiency to retain customer loyalty. For the enablers aspect, self-reference has a strong influence in increasing the efficiency of online purchases. In this case, the existence of technological innovations in SSC will help companies provide experiences and make better offers to customers through personalized items based on each customer's information. In SSC Beauty Tech, companies can add a Skin Analyst feature to identify the user's skin type and problem. This feature allows companies to provide more suitable recommendations to them through facial analysis performed by the system.

For the inhibitors aspect, deceptiveness and information overload had a strong influence as a barrier to online purchasing efficiency.

Companies must avoid and prevent excessive and deceptive information to maintain customer loyalty. The reason is that information provided by a customer through SSC becomes a consideration for other customers in making purchasing decisions. Hence, the manager of SSC Beauty Tech may increase the star-rating scores feature as a form of a quantitative summary of the existing review. Meanwhile, companies can also apply standard formats in writing reviews to anticipate excessive information that does not match reality. The structure is based on the items entered in the user's preferences when first registering. It can help customers understand the information faster so that it takes less time to screen and evaluate products.

On the other hand, UGC Level also plays an essential role in making purchasing decisions made by consumers at SSC. It shows that the contribution made by fellow consumers in creating content related to shopping at SSC can also increase customer loyalty at SSC Beauty Tech. Thus, SSC managers of beauty-techs need to provide *rewards,* e.g., points and discounts on product purchases, to customers who actively create content so that they will be more loyal to the SSC.

## 7 Conclusion

The most striking finding in this study shows that customer loyalty of Indonesian SSC is strongly determined by the quality of OPR (which are deception, overwhelmed information, and self-) and OPB efficiency (cost of product review and quality of making the decision). The moderation test found that UGC is a candidate predictor that needs to be considered in further research because its direct relationship with customer loyalty is always significant even with three types of research models. Moreover, from further testing, it is known that different levels of UGC also influence customer loyalty to SSC. Another interesting result is that although it was carried out on other SSC platforms, statistical tests showed no significant difference between customer behavior at the top 4 beauty-tech companies in Indonesia that dominate the cosmetic market (Female Daily, SOCO, Beautylish and All-Young). Finally, the recommendation to increase customer loyalty in this study is worthy of being used as a reference by all types of SSC in Indonesia.

## 8 Limitation

Although this study provides relevant insights into the relationship between SSC and customer loyalty, all the variables follow [5] to have comparable results when applied in Indonesian beauty-tech. Therefore, future research can conduct further research using additional variables such as strategy discussions [34] and transparency of the recommendation process [34], and openness of the recommendation process [35].

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# Appendix

## Appendix 1 Variable Table

| Variable | Description |
|---|---|
| Self Reference | The suitability of the recommendations provided by the system with the consumer's personal information |
| Vividness | The clarity of product information provided by the system |
| Deceptiveness | The state of product recommended by the system in actuality compared to real situation |
| Information Overload | Complexity of information related to product recommendation and how much of it is presented beyond the required information |
| Website Design | Every elements of the website that can affect the customer experience |
| Customer Service | The responsivity of customer service and how it handles and assists customer problems in a responsive manner |
| Online Shopping Experience | The efficiency of customer experience when online shopping for a product |
| Decision-making Involvement | The degree of customer involvement in purchasing decision of a product |
| Product Screening Cost | The cost perception of customer when looking for a product |
| Product Evaluation Cost | The cost perception of customer when evaluation on a product to buy |
| Decision-making Quality | The level of satisfaction felt by the customer after making a purchase of a product |
| Customer Loyalty | The attitudes shown by the customer through repeat purchase behaviour |
| UGC Level | The level of consumer contribution in creating content and shared value on SSC |

## Appendix 2 Cross Loading Model

| | Customer Loyality | Customer Service | Dec Making Invol | Dec Making Quality | Deceptivenees | Information Overloaded | Product Eval Cost | Product Screen Cost | Self Reference | UGC | Vividness | Website Design |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CUL1 | **0.855** | 0.220 | 0.057 | 0.222 | -0.154 | -0.003 | -0.201 | -0.111 | 0.224 | 0.207 | 0.198 | 0.158 |
| CUL2 | **0.892** | 0.288 | 0.087 | 0.241 | -0.158 | -0.060 | -0.204 | -0.099 | 0.205 | 0.163 | 0.167 | 0.142 |
| CUL3 | **0.873** | 0.256 | 0.125 | 0.236 | -0.202 | -0.113 | -0.210 | -0.186 | 0.180 | 0.209 | 0.200 | 0.157 |
| CUS1 | 0.296 | **0.861** | 0.079 | 0.117 | -0.143 | 0.049 | 0.022 | -0.069 | 0.202 | 0.315 | 0.077 | 0.233 |
| CUS2 | 0.281 | **0.926** | 0.050 | 0.146 | -0.039 | 0.145 | 0.053 | 0.037 | 0.168 | 0.328 | 0.072 | 0.206 |
| CUS3 | 0.196 | **0.869** | 0.151 | 0.126 | -0.094 | 0.127 | 0.019 | 0.014 | 0.205 | 0.306 | 0.092 | 0.219 |
| DEC1 | -0.100 | -0.019 | -0.069 | -0.059 | **0.737** | 0.164 | 0.173 | 0.204 | -0.007 | 0.022 | -0.051 | -0.061 |
| DEC2 | -0.259 | -0.123 | -0.212 | -0.218 | **0.613** | -0.009 | 0.165 | 0.159 | -0.246 | -0.182 | -0.168 | -0.134 |
| DEC3 | -0.127 | -0.092 | -0.154 | -0.183 | **0.838** | 0.182 | 0.197 | 0.236 | -0.062 | -0.007 | -0.100 | 0.013 |
| DEC4 | -0.116 | -0.057 | -0.154 | -0.143 | **0.836** | 0.164 | 0.189 | 0.238 | -0.115 | 0.016 | -0.138 | -0.060 |
| DMI1 | 0.071 | 0.091 | **0.769** | 0.162 | -0.161 | 0.008 | -0.018 | -0.075 | 0.111 | 0.102 | 0.164 | 0.107 |
| DMI2 | 0.032 | 0.112 | **0.851** | 0.203 | -0.152 | -0.023 | -0.032 | -0.101 | 0.187 | 0.171 | 0.170 | 0.113 |
| DMI3 | 0.151 | 0.045 | **0.804** | 0.158 | -0.168 | -0.040 | -0.080 | -0.122 | 0.133 | 0.129 | 0.126 | 0.134 |
| DMQ1 | 0.245 | 0.119 | 0.151 | **0.860** | -0.200 | -0.173 | -0.208 | -0.293 | 0.239 | 0.068 | 0.180 | 0.115 |
| DMQ2 | 0.226 | 0.094 | 0.200 | **0.857** | -0.160 | -0.144 | -0.179 | -0.245 | 0.213 | 0.070 | 0.193 | 0.149 |
| DMQ3 | 0.205 | 0.163 | 0.201 | **0.819** | -0.155 | -0.033 | -0.129 | -0.232 | 0.258 | 0.153 | 0.164 | 0.164 |
| INO1 | -0.036 | 0.100 | 0.011 | -0.083 | 0.124 | **0.853** | 0.326 | 0.301 | -0.023 | 0.194 | -0.066 | -0.006 |
| INO2 | -0.074 | 0.105 | -0.062 | -0.177 | 0.149 | **0.893** | 0.393 | 0.378 | -0.092 | 0.119 | -0.088 | -0.039 |
| INO3 | -0.067 | 0.124 | -0.006 | -0.098 | 0.166 | **0.897** | 0.343 | 0.341 | -0.102 | 0.145 | -0.083 | -0.016 |
| PEC1 | -0.198 | 0.058 | -0.018 | -0.169 | 0.178 | 0.410 | **0.897** | 0.322 | -0.092 | 0.115 | -0.074 | -0.012 |
| PEC2 | -0.216 | 0.059 | -0.088 | -0.158 | 0.212 | 0.353 | **0.910** | 0.357 | -0.112 | 0.020 | -0.134 | -0.043 |
| PEC3 | -0.223 | -0.016 | -0.043 | -0.228 | 0.259 | 0.332 | **0.903** | 0.339 | -0.142 | 0.092 | -0.100 | -0.012 |
| PSC1 | -0.091 | 0.068 | -0.101 | -0.210 | 0.235 | 0.369 | 0.328 | **0.872** | -0.086 | 0.113 | -0.129 | -0.068 |
| PSC2 | -0.163 | -0.007 | -0.098 | -0.238 | 0.237 | 0.379 | 0.374 | **0.878** | -0.135 | 0.115 | -0.131 | -0.076 |
| PSC3 | -0.116 | -0.093 | -0.108 | -0.322 | 0.199 | 0.151 | 0.174 | **0.649** | -0.241 | 0.036 | -0.172 | -0.123 |
| SRE1 | 0.265 | 0.151 | 0.101 | 0.218 | -0.083 | -0.078 | -0.080 | -0.122 | **0.756** | 0.107 | 0.198 | 0.201 |
| SRE2 | 0.112 | 0.136 | 0.184 | 0.112 | -0.115 | -0.093 | -0.162 | -0.149 | **0.713** | 0.086 | 0.209 | 0.202 |
| SRE3 | 0.171 | 0.153 | 0.125 | 0.279 | -0.128 | -0.081 | -0.079 | -0.159 | **0.815** | 0.125 | 0.235 | 0.189 |
| SRE4 | 0.143 | 0.212 | 0.149 | 0.207 | -0.103 | -0.002 | -0.080 | -0.097 | **0.728** | 0.112 | 0.236 | 0.182 |
| UGL1 | 0.134 | 0.228 | 0.143 | 0.118 | 0.015 | 0.167 | 0.055 | 0.046 | 0.176 | **0.761** | 0.118 | 0.083 |
| UGL2 | 0.195 | 0.326 | 0.174 | 0.086 | -0.065 | 0.167 | 0.102 | 0.105 | 0.146 | **0.900** | 0.107 | 0.118 |
| UGL3 | 0.228 | 0.349 | 0.126 | 0.099 | -0.058 | 0.121 | 0.060 | 0.130 | 0.080 | **0.918** | 0.101 | 0.136 |
| VIV1 | 0.166 | 0.070 | 0.121 | 0.141 | -0.156 | -0.086 | -0.123 | -0.140 | 0.278 | 0.124 | **0.787** | 0.175 |
| VIV2 | 0.206 | 0.028 | 0.200 | 0.188 | -0.118 | -0.079 | -0.130 | -0.126 | 0.221 | 0.111 | **0.846** | 0.107 |
| VIV3 | 0.130 | 0.141 | 0.112 | 0.174 | -0.086 | -0.046 | 0.010 | -0.151 | 0.192 | 0.045 | **0.738** | 0.107 |
| WED1 | 0.133 | 0.194 | 0.073 | 0.158 | -0.047 | -0.073 | -0.034 | -0.148 | 0.212 | 0.072 | 0.079 | **0.866** |
| WED2 | 0.107 | 0.105 | 0.126 | 0.130 | -0.046 | 0.056 | -0.002 | -0.015 | 0.174 | 0.067 | 0.159 | **0.721** |
| WED3 | 0.170 | 0.242 | 0.196 | 0.096 | -0.030 | -0.031 | -0.018 | -0.048 | 0.198 | 0.156 | 0.181 | **0.647** |
| WED4 | 0.115 | 0.202 | 0.070 | 0.083 | -0.134 | 0.032 | 0.000 | -0.025 | 0.159 | 0.151 | 0.103 | **0.653** |

## Appendix 3 Research Hypothesis

| Hypothesis Code | Hypothesis Description |
|---|---|
| $H_{1a}$ | Self reference negatively associated to product screening cost |
| $H_{1b}$ | Self Reference positively associated to product evaluation cost |
| $H_{1c}$ | Self Reference positively associated to decision-making quality |
| $H_{2a}$ | Vividness negatively associated to product evaluation cost |
| $H_{2b}$ | Vividness positively associated to decision-making quality |
| $H_{3a}$ | Deceptiveness positively associated to product screening cost |
| $H_{3b}$ | Deceptiveness positively associated to product evaluation cost |
| $H_{3c}$ | Deceptiveness negatively associated to decision-making quality |
| $H_{4a}$ | Information overload positively associated to product screening cost |
| $H_{4b}$ | Information overload positively associated to product evaluation cost |
| $H_{4c}$ | Information overload negatively associated to decision-making quality |
| $H_{5a}$ | Deception has a greater impact on product screening costs than self-reference. |
| $H_{5b}$ | An overwhelming information has a greater impact on the cost of product screening than self-reference. |
| $H_{5c}$ | Deceptiveness has a stronger effect on product evaluation cost than self reference and vividness. |
| $H_{5d}$ | Information overload has a stronger effect on product evaluation cost than vividness and self reference |
| $H_{5e}$ | Deception affects the quality of decision making more than vividness and self-reference |
| $H_{5f}$ | Information overload has a greater impact on decision-making quality than self-reference and vividness. |
| $H_{6}$ | Product screening cost is negatively associated with customer loyalty. |
| $H_{7}$ | Product evaluation cost is negatively associated with customer loyalty. |
| $H_{8}$ | Decision-making quality is positively associated with customer loyalty. |

## Appendix 4 Moderation Test Hypothesis

| Hypothesis Code | Hypothesis Description |
|---|---|
| $H_{9a}$ | If the customer is aware of a higher level of UGC, the negative impact of product screening costs on customer loyalty will be lessened. |
| $H_{9b}$ | As customers perceive higher levels of UGC, the negative impact of product evaluation costs on customer loyalty is diminished. |
| $H_{9c}$ | As customers perceive higher UGC levels, the positive effect of decision quality on customer loyalty diminishes. |

## Appendix 5 Hypothesis Test Result and Moderation

| H | Hypothesis | P Values | Supported |
|---|---|---|---|
| $H_{1a}$ | Self Reference to Product Screening Cost | 0.025 | Yes |
| $H_{1b}$ | Self Reference to Product Evaluation Cost | 0.077 | No |
| $H_{1c}$ | Self Reference to Decision Making Quality | 0.001 | Yes |
| $H_{2a}$ | Vividness to Product Evaluation Cost | 0.250 | No |
| $H_{2b}$ | Vividnes to Decision Making Quality | 0.056 | No |
| $H_{3a}$ | Deceptivenees to Product Screening Cost | 0.000 | Yes |
| $H_{3b}$ | Deceptivenees to Product Evaluation Cost | 0.000 | Yes |
| $H_{3c}$ | Deceptivenees to Decision Making Quality | 0.024 | Yes |
| $H_{4a}$ | Information Overloaded to Product Screening Cost | 0.000 | Yes |
| $H_{4b}$ | Information Overloaded to Product Evaluation Cost | 0.000 | Yes |
| $H_{4c}$ | Information Overloaded to Decision Making Quality | 0.023 | Yes |
| $H_{6}$ | Product Screen Cost to Customer Loyalty | 0.192 | No |
| $H_{7}$ | Product Eval Cost to Customer Loyalty | 0.000 | Yes |
| $H_{8}$ | Decision Making Quality to Customer Loyalty | 0.001 | Yes |
| $H_{9a}$ | UGC Level X PEC to Customer Loyality | 0.120 | No |
| $H_{9b}$ | UGC Level X PSC to Customer Loyality | 0.456 | No |
| $H_{9c}$ | UGC Level x DMQ to Customer Loyality | 0.024 | Yes |

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