# Examining Luxury Hotels' Social Media Marketing on Customer Engagement Using Big Data Analytics and Natural Language Processing

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Abstract. During this pandemic, stakeholders of tourism and hospitality in Indonesia have to adjust their strategy to survive. Even though most Indonesia users are active and consumptive on the Internet, they need motivational drives such as an engagement to spend money for leisure. This research will examine the impact of social media marketing (SMM) on customer engagement in luxury hotels during the pandemic situations by utilizing the real time benefits of big data. Firstly, formed panel data of SMM and customer engagement. Researchers scripted real time data from social media accounts of the hotels then use natural processing language (NLP) and automated text analysis to processed the data. Then, for the impact analysis, researchers utilized a panel data regression from the transformed data panel. The results were describing the SMM related to four dimensions which are entertainment, trendiness, interaction, customization, and also the engagement activities. The results discovered that the random-effect model was suitable to determine the influence of SMM on customer engagement. During the pandemic, customer engagement was influenced by other unobservable variables besides entertainment, trendiness, customization, and interaction dimension. The marketer and hoteliers can get new perspectives about overcoming SMM on Instagram during this pandemic. Based on the previous study that has been done in luxury brands, this study will be more useful for tourism and hospitality stakeholders.

**Keywords:** Customer Engagement, Social Media Marketing, Luxury Hotel, Natural Language Processing, Big Data

## 1 Introduction

In early 2020, Indonesia has to face the Covid-19 Pandemic. These air-bone viruses force the government to implement restrictions of social interaction (PSBB). As the World Health Organization (WHO)'s official statement, it began on thirtieth January 2020 onward. Many sectors that depend on massive movement collapsed during this pandemic, such as the tourism industry. The occupancy rate of 1500 hotels in Indonesia dropped to range 0% - 8% (March 2020), in regular situations, it may be in the range 40 or 50%. International tourists fell significantly by about 88% in 2020. However, the room occupancy rate (TPK) of star hotels in Indonesia in December 2020 increased by + 0.65% compared to November 2020. This can indicate that domestic tourists are starting to take year-end holidays in the country by choosing to stay at star hotels.

Luxury hotels must realize that brands have an important role in business success [1]. Customers will become loyal to the brand when they have gone through the engagement stage. This relationship is created because of satisfaction and emotional bonds [2]. In making marketing efforts, the company will try to create customer engagement with the services provided. PT Grahawita Santika is one of the companies that has implemented engagement by making special offers through the MySantika website and application for loyalty members. However, to reach a wider range of customers, just making an application is not enough because they have to stay overnight in order to become a loyalty member.

Based on previous research conducted in India by Mohsin and Lockyer [3], visitors to luxury hotels prioritize hotel atmosphere and staff politeness. The relationship between friendly staff and visitors will greatly affect customer satisfaction and loyalty [4]. Most of the research that has been conducted on luxury hotels discusses customer engagement using surveys and interviews. This does not represent a broader and more comprehensive perspective. The customer experience is not limited to one channel because every point of interaction that is made will affect the customer's feelings in making transactions [5].

Social media has big data that researchers can use to analyse engagement activities that occur in luxury hotels. With the increasing intensity of use of social media marketing by hotel brands, it is necessary to analyse the effects of social media on customer engagement. Based on the conditions that have been stated, there were few purpose which are to analyse entertainment and trendiness carried out by luxury hotel brands on social media marketing, analyse interactions carried out by luxury hotel brands on social media marketing, analyse customization carried out by luxury hotel brands on social media marketing, analyse customer engagement carried out by luxury hotel brands on social media marketing, and analysing the impact of social media marketing on customer engagement in luxury hotels.

Using big data methodologies, this research will examine the impact of luxury hotels' social media marketing on customer engagement. This study will look at the characteristics of social media marketing that are carried out first in accordance with the strategy used by hotels in the process of customer engagement [6]. The impact of social media marketing on customer engagement with brands during the epidemic in Indonesia will be examined using the term coined by researchers [2].

## 2 Literature Review

## 2.1 Customer Engagement Behavior

Starting from Calder and Malthouse [7] who pay attention to the experience of consumer psychology when enjoying media content, engagement can be used to see the motivational side of the consumer experience and separate it from the hedonic side. Customer satisfaction and emotional management can use a customer engagement matrix which includes emotional intensity and customer satisfaction levels. There are two constructs of customer engagement, namely direct and indirect contributions [2]. Contributions are direct in the form of purchases and indirectly in the form of recommendations, influence by customers, and customer knowledge. This research focuses on indirect contributions to B2C companies. Indirect contributions can be shown by referrals from customers to their relatives. The higher the level of comfort felt by the customer, the higher the likelihood that the customer will provide referrals through content on social media that can promote a brand or company [2]. Influence, many customers do not hesitate to exchange information related to brands or products. Users

can influence the activities of other users who are still in the same social network, and this is known as influence [8]. Feedback and knowledge possessed by customers can help companies to better understand customer preferences [9]. By utilizing this knowledge, companies can improve services or create new products that lead to an indirect increase in performance [10].

## 2.2 Social Media Marketing in Luxury Brands

Social media can have a big impact on brand reputation [11]. Based on research eMarketer [12] social media is seen by marketers as a branding tool to increase awareness and accompany brand-related opinions. In social media, consumers can participate and share content displayed by the brand. The behaviour carried out by consumers on social media will result in the mention of brand names in interactions with their scope known as influence impressions [13] and this is a simple form of word-of-mouth communication.

Entertainment, interactivity, trendiness, customisation, and word-of-mouth are the five characteristics that affect social media marketing operations for luxury brands [6]. When it comes to social media brands, the entertainment dimension in question is material that connects the audience with a fun atmosphere. The audience exchanges opinions about the social media brand during the encounter. The term "trendiness" refers to products from new brands that are current. In social media marketing, the dimension of information formation is the simplicity with which the audience may access information and receive a personalized answer. Word of mouth on the social media marketing brand refers to the customer's desire to spread the information seen on the brand's social media account.

# 2.3 Special Interest Tourism: Luxury Tourism

Luxury is more accurately defined as an experience rather than just a product [14]. Luxury cannot be defined as a word because there are four perspectives that refer to luxury as a brand, luxurious product features, meaning things that are not mandatory, and a power to achieve passion [15]. Luxury tourism can be understood as a social phenomenon involving status and prestige [16]. This will encourage individuals to act outside normal or very unusual patterns. The luxury perspective will emerge from the process of making information related to the image of a destination. One of the main things in a tourist's holiday experience is the quality of the accommodation [4]. Referring to the Malaysian Tourism Board, hotels that match the image of luxury are five-star deluxe, five and four-star hotels [17]. It is important for players in the tourism and hospitality sector to realize that consumers who complain to service providers will not return and can share their experiences via the internet [17]. Based on Liu et al. [18] a personalized and special service will increase repeat tourist visits. Repeater guests prioritize hotel brands as a form of brand loyalty [19]. For first-time visitors to luxury hotels, customers rely heavily on brand awareness in hotel selection. They will be attracted by the visual appeal that gives a positive impression, a strong brand image among customers, and the performance of the hotel [18].

## 3 Method

#### 3.1 Research Flow

The data collected within the period of pandemic in 2020 (from January 30 to December, 31). Data obtained from 10 Instagram accounts of luxury hotels and resorts based on traveller

rank of 2020 on TripAdvisor. Researcher prefer to utilized Instagram than TripAdvisor, due to the definition of social media. Harvey [20] argued that social media must be accommodate the interactive and participation of users. The data obtained is in the form of Microsoft Excel and then the data is cleaned using natural processing language. Then the data labelling is done manually by automated text analysis on the cleaned data, based on the dimensions of social media marketing proposed by Kim and Ko [11] as well as the dimensions of customer engagement based on indirect contribution concept by Pansari and Kumar [2]. This stage develops an overview of social media marketing and the customer engagement activities carried out at luxury hotels and resorts. The research was continued with data panel regression to classified the impact of social media marketing on customer engagement in luxury hotels and resorts.

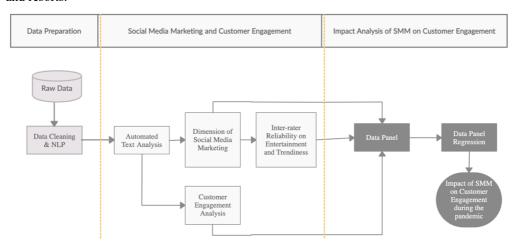


Fig. 1. Big Data Analytics Workflow (Modified from QoS and Customizable Transaction-aware Selection for Big Data Analytics on Automatic Service Composition [21])

## 3.2 Data Transformation

Unstructured data was obtained through scraping Instagram using the Octoparse application including textual data, namely account name, post title, number of likes, posting time, comments from internet users, and URL link posts. In collecting the big data, 3,981 data needed to be transformed into structured data. After downloading the data into Microsoft Excel format, observations were made on the likes, followers, following and comments that were dynamic in nature. So, at this stage, the latest data will be downloaded, which is 3 months after the end of 2020 peak holiday season occurs.

Table 1. Unstructured data

Hotel Name	Instagram Account	Number of Followers	Total Posts	Row Pre- processing Data
The Kayon Resort by	@thekayonresort	36,771	1,096	420
Pramana				
The Trans Resort Bali	@thetransresortbali	25,636	1,254	388
Grand Mercure Surabaya	@grandmercuresur	3,088	430	202

City	abayacity			
Mandapa a Ritz-Carlton	@mandapareserve	50,588	1,631	375
Reserve				
Padma Resort Ubud	@padmaubud	85,810	2,315	1448
Mandarin Oriental	@mo_jakarta	21,341	2,288	329
The Legian Bali	@thelegianbali	32,248	1,212	254
Viceroy Bali	@viceroybali	80,322	730	132
Tanah Gajah Resort Ubud	@tanahgajahubud	22,944	326	389
Luxe Villas Bali	@luxevillasbali	2,216	519	44

Note: Information was updated on March 29, 2021.

After obtaining the unstructured data, an NLP (natural processing language) procedure was carried out using python. NLP is done to convert text into a predictable form and it is easy for machine learning to perform analysis on that text. All NLP procedures are done in English as most of the comments are written in English. In this procedure, punctuation is removed, apart from the '@' which acts as a mention in the comment's column. Subsequently, emojis were removed in the comments column because researchers did not get scientific literature that supports the meaning of emoticons in general. Then the stop words or words that are connected, affixes, and other words that often appear but are not related to the textual context are eliminated. Deleting stop words is very important in order to avoid inaccuracies when tokenizing existing sentences. After the stop words are removed, tokenization is carried out to find out the most words. Researchers cleaned the blank, emoticon, and any lexicon in the post title and comment section.

Identifying and recognizing text based on language in order to build hypotheses and make valid conclusions [22]. Language not only describes the cognitive component but also shows the emotions felt by consumers [23]. The language structure used by the consumer can show different types of processing by the sender and different responses by the reader. In interpreting and analysing the results, there are three ways that can be done to incorporate the results into research, namely making comparisons between groups, correlating between textual elements, and predicting variables outside the text. In this study, a comparison between groups was carried out using the usual word frequency calculation and using the term frequency (TF) and inverse document frequency (IDF) which represent the weight of the words used from the overall data. Tf-idf is very useful for improving the weight of rare words and can be an addition in testing hypotheses. If only term frequency is used, the resulting analysis is not normally distributed.

	Text \
0 gr	randmercuresurabayacity
_	randmercuresurabayacity
_	randmercuresurabayacity
3 gr	randmercuresurabayacity
_	randmercuresurabayacity
	···
1426	viceroybali
1427	viceroybali
1428	viceroybali
1429	viceroybali
1430	viceroybali

```
Caption Text2
                                              likes \
    Wishing you and your family a very healthy, pr... 15w
                                                          44 likes
    A fluffy morning treat to start your day\n@pat... 15w
    The bells are jingling, the house is covered i... 16w
    One of our traditional appetizers "Rujak Manis" ... 16w
                                                            45 likes
    Vegetable Puree with Fish Salad\n\nCreative re... 16w
                                                           58 likes
1426 Somewhere you might want to voluntarily isolat... 55w 1,087 likes
1427 In this travel environment, enjoy the space an... 57w
1428 Take the plunge and dive into your honeymoon w... 57w 1,126 likes
1429 Today's forecast: stunning sunrise with a drop... 58w
                                                          940 likes
1430 At the end of this month of love we want to sa... 58w
                                      new Caption
           time
    DECEMBER 31, 2020
                                            happy new year 2021
    DECEMBER 29, 2020
                                             @patitarestaurant
1
2
    DECEMBER 24, 2020 wishing family health happiness peace prosperi...
3
                                 becoming favorite refreshes mood today
    DECEMBER 24, 2020
4
    DECEMBER 24, 2020
                                        creative recipe chef deni
1426
       MARCH 22, 2020
1427
       MARCH 14, 2020
        MARCH 9, 2020
1428
1429
        MARCH 5, 2020
1430
        MARCH 1, 2020
[1431 rows x 6 columns]
```

Fig. 2. Print out of Data Cleaning Process.

## 3.3 Data Panel Regression

Data panels provide more informative, varied, degrees of freedom and higher efficiency data [24]. Information bias that arises due to large amounts of data can be minimized by aggregating individuals into a wider one through the data panel. This study uses panel data in order to study changing phenomena and complex behavioural models. This study uses a balanced panel because the units have the same number of time-series. In the regression data panel, there are three types of models, namely common effect, fixed effect, and random effect.

With these three models, it is necessary to determine the appropriate model for panel data regression using the Chow, Hausman, and Lagrange Multiplier (LM) tests. Chow test is used to determine whether the panel data is more in line with the common effect or fixed effect model. When p value (Prob>F) < 0.05 then the best choice is the fixed effect model. The use of the Hausman test is usually carried out in order to determine the RE or FE model that is more suitable [25]. Furthermore, if the results obtained from the Hausman test p value> 0.05, it is necessary to test the results of the LM test which shows p-value <0.05 in order to reject Ho which states that there is no irregular variant that affects the dependent variable.

# 4 Result and Discussions

# 4.1 Social Media Marketing during 2020

#### 4.1.1 Entertainment

In coding the caption that shows the entertainment dimension, words that describe the entertainment dimension are identified. Based on the definition of the entertainment dimension by Kim and Ko [6], there are 2 words, namely "fun" and "interesting". Next, the researcher looked for other words related to the perception of the entertainment dimension in the existing luxury hotel caption data set. The selected words obtained krippendorff  $\alpha > 0.67$  ( $\alpha = 0.68$ ), and means those was acceptable to represent the entertainment dimension. The following results for words that have been associated with the Entertainment dimension.

Table 2. Entertainment Dimension

Entertainment dimension (17 words)

Amuse, Entertain, Fun, Interesting, Fair, Presentation, Performance, Playing, Pleasure, Good time, Leisure, Relaxation, A blast, Recreation, Enjoy, Exciting, Fascinating

#### 4.1.2 Trendiness

The analysis begins by identifying the words that describe the dimensions following the times in the textual caption data coding process. Based on the definition of the dimensions following the times by Kim and Ko [6], there are 2 words, namely "newest" and "trendy". Next, the researchers looked for other words related to the perception of dimensions following the times in the collection of luxury hotel caption data on Instagram. The selected words obtained krippendorff  $\alpha > 0.67$  ( $\alpha = 0.71$ ), and means those was acceptable to represent the trendiness dimension. The following are the results of the words obtained according to the Trendiness dimension.

Table 3. Trendlines Dimension

Trendiness dimension (17 words)

Trendy, Newest, Cool, Fashionable, Stylish, Update, Pandemic, Latest, Enhanced, Maintain, Special, Season, Sharing, Luxurious, Christmas, New Normal, New Normal

#### 4.1.3 Interaction

The Instagram platform does provide a '@mention' feature or mark in the comment's column, write titles, or other content to make it easier for users to share content with their relatives. In this study, the interaction dimension was calculated based on the amount of content posted on social media. In addition, the number of mentions, reposts and hashtags used by the hotel is also an indicator of the interaction dimensions used.

## 4.1.4 Customization

Based on Kim and Ko [6], customization showed by the accessible of search information for the users. With the direct message feature, customers can ask their needs directly to the hotel. In addition, there were several customers who immediately received a response from the hotel by reposting their opinion on the feed.

# 4.2 Customer Engagement of Luxury Hotel

## 4.2.1 Referral and Influence

Users of social media can give referral to their relative and share information with them [2]. Browning and Sparks [26] argued that user's opinion was more reliable for other users when they want to make decision. Instagram allows followers of the hotel account to comment and tag friends in the comment's column. Followers can also tag related brands if they want to tag them in another comment column. However, due to limitations in obtaining tagging data on other accounts, referrals and influences are assessed based on the number of mentions in the hotel comments column.

## 4.2.2 Feedback

An assessment is carried out on words that reflect the experience of the customer in the hotel comment column. In this analysis, the number of words that represent positive, negative, or neutral experiences is counted.

## 4.2.3 Customer Engagement

Customer engagement is a combination of the referral value, influence, and feedback obtained in the comment's column. The results found that The Kayon Resort and Padma Ubud had the highest number of customer engagements out of ten other hotels. Meanwhile, Grand Mercure Surabaya has the lowest number compared to other hotels (as shown in Figure 2).

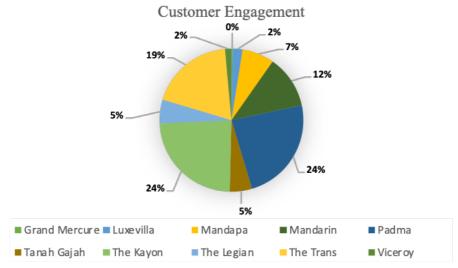


Fig. 3. Summary of Customer Engagement in 2020

# 4.3 Impact Analysis of SMM on Customer Engagement

There are three steps to decide the suitable model for the data panel [24], which begin with Chow test, followed by Hausman test, and LM test. Firstly, we ran Chow test and discovered p-value < 0.05 which means lead to fixed-effect model. Then, we ran Hausman test to decide whether a fixed or random effect would be the suitable choice. The *p*-value (Prob>F) of Hausman test was > 0.05, which means random-effect was right choice. To confirmed the random-effect model, researcher run LM test and the results shown p-value < 0.05 (fig. 3). It confirmed that random-effect was happened among the SMM and customer engagement.

## . xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

CustomerEngagement[Hotelnum,t] = Xb + u[Hotelnum] + e[Hotelnum,t]

Prob > chibar2 = 0.0002

Fig. 4. LM test result

The effect of SMM effort on customer engagement in Luxury Hotels are presented in Table 4. The result from the model show that social media marketing activities have effects on customer engagement was interaction (p < 0.05). On the other hand, entertainment, customization and trendiness (p > 0.05) had unobservable variable on customer engagement during this pandemic.

Table 4. The effect of SMM effort on customer engagement in Luxury Hotels
. xtreg CustomerEngagement Entertainment Trendiness Interaction Customization, re

Random-effects Group variable	-	n		Number of Number of		=	120 10
<pre>R-sq:     within =     between =     overall =</pre>	0.7355			Obs per g	mi av	in = /g = ax =	12 12.0 12
corr(u_i, X)	= 0 (assumed)			Wald chi2 Prob > ch	` '	=	77.73 0.0000
CustomerEng~t	Coef.	Std. Err.	z	P>   z	[95%	Conf.	Interval]
Entertainment Trendiness Interaction Customization _cons	0884505 6901213 .6262157 -1.528721 .1663965	.190993 .4729977 .0851762 .7096184 1.298471	-0.46 -1.46 7.35 -2.15 0.13	0.643 0.145 0.000 0.031 0.898	46 -1.61 .4592 -2.919	1718 1735 1548	.2858889 .2369371 .793158 1378951 2.711353
sigma_u sigma_e rho	2.9877138 5.3770488 .2359051	(fraction	of varia	nce due to	u_i)		

## 5 Conclusion

The results represented that interaction play big role in social media marketing effort of Luxury Hotels during pandemic. Therefore, enhancement in interaction was the most importance for managerial. To increase the interaction, hotels may offer various user generated content in their social media. Cited the perspective of Harvey [20] that nature of social media was interaction and participation. People tend to utilized social media as a tool to interact with whoever they want.

This research shown that entertainment, customization and trendiness coefficient were negative. The unexpected finding that customization did not increase the customer engagement with the brand even though it has p-value <0.05. The managerial should consider to maintain the information flow of their direct responses in the caption. This research does not suggest that firm should ignore direct response, but hotels may investigate the external reasons of this phenomenon.

The entertainment and trendiness were obviously influenced by unobservable variable during the pandemic. Posting entertain and the newest content weren't enough to attract the users' emotion. Consideration of external factors was needed too. There's some policy for the adjustment of pandemic situation, mobilization and activities was limited by those. The interest of potential customer may be plummeted due to the limitation.

Lastly, this research examined the social media efforts of top 10 luxury hotel in Indonesia as stated by TripAdvisor. But researcher didn't used the engagement on TripAdvisor website because the consideration of social media's nature. Although the big data analytics analysed large volume of captions over a year period, further study need to require examination a more diverse sample of luxury hotels or type of accommodation.

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