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WOM and SENTIMENT Analysis Has Positive Influence to Positive or Negative Emotion from Class 11 or 12 in Jakarta and Surrounding Area

Hendra Achmadi

hendra.achmadi@uph.edu

Faculty of Economics and Business, Universitas Pelita Harapan, Tangerang, Indonesia

Abstract. College selection is one of the decision-making processes in life that must be passed by high school students, the influence of WOM (Word of Mouth) and SENTIMEN Analysis originating from social media Twitter does it affect positive and negative emotions that arise when students This high school student listens to college offers from marketing. The influence of WOM in this study is from two sources, namely the influence of parents and the second is the influence of friends. Meanwhile, the SENTIMEN analysis was taken from 105 universities' social media twitter, while the emotional factor was taken from the PANAS scale. Primary data retrieval to 105 respondents from 11th and 12th grade high school students by using Google forms, while secondary data SENTIMEN analysis uses python program to 105 universities with 100 tweets so that the tweet data taken is 10500 tweets, and by using natural language processing then positive, neutral and negative sentiments can be distinguished. Then data processing using PLS-SEM. And from the results of data processing, it was found that WOM and SENTIMEN had a positive effect on positive emotion of R2 by 15.3% and negative emotion by R2 of 17.4%. SENTIMEN analysis had no effect on positive emotion and negative emotion.

Keywords: PANAS Scale; Positive Emotion and Negative Emotion; WOM and SENTIMEN analysis

1. Introduction

Grade 11 and 12 high school graduates in Indonesia from 2018 to 2019 were 20 percent, while the number of students entering private universities decreased from 2017 to 2019 by 87.2 percent, while there was an increase in the number of new students entering public universities by 24 percent. between 2018 and 2019. In addition, many previous studies that have been carried out have discussed the attitude factor and also the ratio in the decision making of 11th and 12th grade high school students in selecting universities in Indonesia. While the emotional factor is still very rarely discussed in previous studies.

High school students who will choose this college are included in generations Y and Z who were born between 2000-2003 which according to research from Viswanathan and Fain (2013) says that in generation Y in making decisions based on emotions and impulses. And in decision making, generations Y and Z are still very unstable so they need opinions from family and friends, therefore WOM is a stimulus factor that can influence decision making. Generations Y and Z are known as the digital generation, where in searching for information a lot of people use social media, so in this study, sentiment analysis data was taken from tweeters.

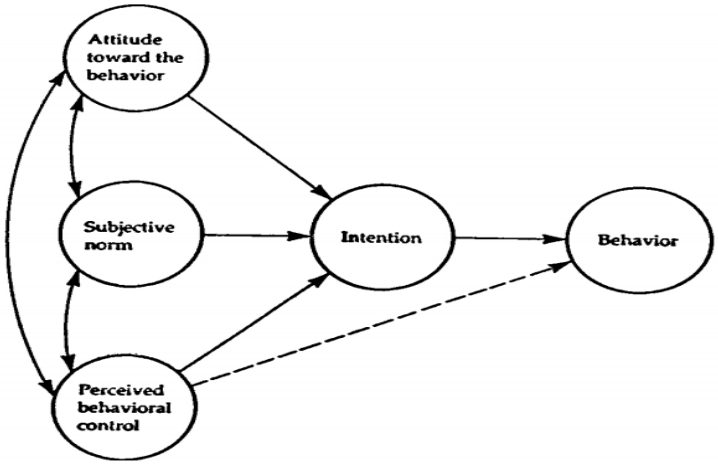
Research on emotions that will drive decision-making has been started in the world of marketing by Bagozzi, Gopinath and Nyer (1999), then continued by the research of Seligman (2011) and continued by a large study conducted by Lerner et al. (2014) with a large study entitled emotion and decision making.

2. Literature Review

2.1 Theory of Interpersonal Behaviour

According to Triandis (1977) Theory of Interpersonal Behavior adds a habit factor that determines behavior intention. Egmond & Bruel (2007) describes the TIB model by adding the hebit factor. Emotion to affect to Intention, which, because in previous research with the theory of TPB (Theory of Planned Behavior) according to AJZEN, ICEK (1991) as shown in Figure 2.1.

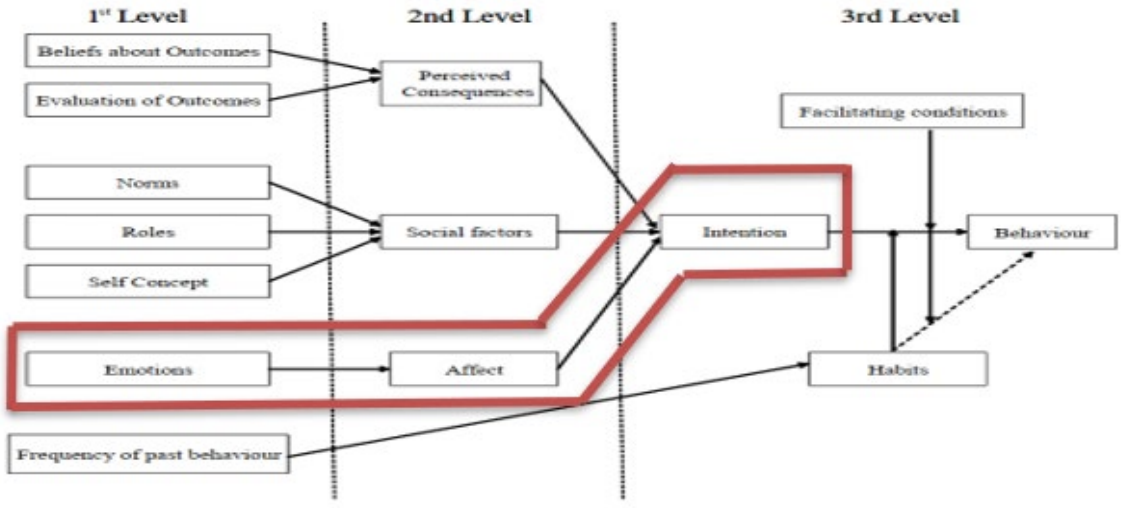
Figure 2.1
Theory of Planned Behavior



Source: AJZEN, ICEK (1991)

The Theory of Planned Behavior consists of three main variables that affect Intention, namely the attitude toward the behavior which describes the evaluation or assessment of the good or bad of the behavior. The second is subjective norm which is influenced by the perceived social pressure to intention behavior, and while perceived behavioral control is the perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles. This theory is used to describe what factors encourage someone to do intention, but this theory has limitations, namely it does not discuss emotional factors that encourage someone to make decisions. Therefore adding about Emotion to Affection which will affect someone in decision making (Triandis, 1977).

Figure 2.2
Triandis Theory of Interpersonal Behavior



Source: Egmond & Bruel (2007)

2.2 SENTIMEN Analysis

According to Achmadi et al. (2019), the results of the decisions of new students in making decisions, it appears that university quality has an effect of 0.433 on WOM. And since 2016 the Ministry of Education and Culture of the Republic of Indonesia has issued a benchmark for conducting research on private universities in Indonesia called the Accreditation of Private Universities. The perception of the quality of higher education in Indonesia is widely discussed by netizens on social media, especially social media tweeters. Sentiment analysis was used to investigate online comments from MOOC participants. Lundqvist, Liyanagunawardena and Starkey (2020). According to Prinsloo, Slade & Khalil (2019) Sentiment Analysis refers to a set of

methods, techniques, and tools for detecting and extracting subjective information, such as opinions and attitudes, from language..

2.3 WOM

WOM-driven decision-making has long been researched. WOM is a source that influences interpersonal communication. WOM is information from family and friends. Le, Robinson and Dobele (2019). WOM is also defined as a source of information (Harold et al., 2016). Finally, Oluwafemi and Dastane (2016) said WOM is an act to tell others about the experiences they have experienced.

2.4 WOM dan Emotion

In a study conducted by White (2011) on students in Australia, it was concluded that there was an indirect relationship between positive and negative emotions and WOM. Many previous studies conducted research on the relationship between WOM and new perceived emotional value to emotion, such as that conducted by Oluwafemi and Dastane (2016) which stated that WOM had a significant positive effect on perceived value (epistemic value and emotional value). Meanwhile, Susilowati and Sugandini (2018) stated that there was a significant traditional WOM influence on perceived quality, which included in perceived quality all values quantitatively or qualitatively (which can be felt or emotional value). Hanum et al. (2020) stated that WOM has a significant effect on perceived value (epistemic value, functional value, emotional value and social value). Meanwhile, Fazal-e-Hasana, et al. (2018) states the effect of perceived value quality on hope. Ahn and Kwon (2019) stated that the effect of perceived value (economic, social, hedonic, altruistic) had a significant effect on positive anticipated emotion, therefore in this study the direct relationship between WOM and emotion will be tested.

2.5 SENTIMEN Analysis dengan Emotion

Sentiment and emotion are difficult to separate because emotion is very close to sentiment, indeed, how to measure the strength of opinion is related to the intensity of certain emotions. Emotion is a complex psychological state consisting of subjective feelings that can manifest in physiological responses and produce behavioral responses such as smiling when feeling happy. Sentiments are mental attitudes, informed by emotions, and linking cognitive and physiological aspects with social and cultural aspects. Prinsloo et al. (2019). In the context of natural language processing, sentiment is expressed in binary terms (e.g., positive versus negative), whereas emotion is multidimensional (e.g., anger, sadness, fear). Liu (2015)

2.6 Emotion

According to (Ana I. Callejas-Albiñana1, Fernando E. Callejas-Albiñana and Isabel Martínez-Rodríguez, 2016) said that the key variable of the empirical study here is how Electronic Word of Mouth, customer behavior and emotional factors in decision making. In some studies focusing on how consumers receive information and process it to make decisions based on rational fundamentals according to (Solomon, 1998) which focuses on the decision-making process and branding evaluation, while according to (Bagozzi, Gopinath, and Pieters, 1999) suggest, conditions that necessary for an emotional response to a situation or event is that the person already has a vested interest in the situation and is willing and able to assess the situation. But from research because there are still few studies that discuss the influence of any emotional factors that affect decision making of students in high school. In exploring what positive and negative emotions arise in high school students, in this study using the PANAS Scale which has been studied by (David Watson & Lee Anna Clark, 1988) says that emotions are divided into positive emotions and negative emotions or also called emotions. positive affect and negative affect, and a list of positive and negative affect as below:

Positive affect

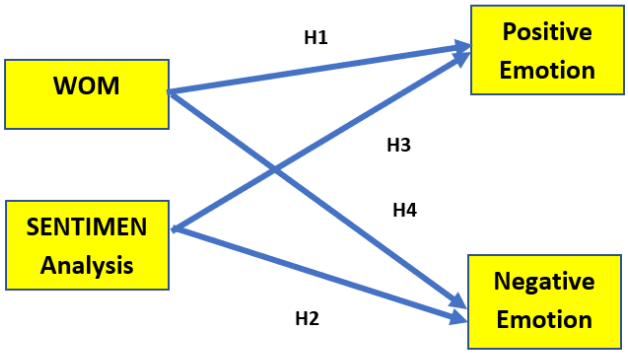
1. Attentive
2. Active
3. Alert
4. Excited
5. Enthusiastic
6. Determined
7. Inspired
8. Proud
9. Interested
10. Strong

Negative affect

1. Hostile

2. Irritable
3. Ashamed
4. Guilty
5. Distressed
6. Upset
7. Scared
8. Afraid
9. Jittery
10. Nervous

2.7 Conceptual Framework



Hypotesis

H1: WOM has a positive effect on Positive Emotion
H2: WOM has a positive effect on Negative Emotion
H3: SENTIMEN Analysis has a positive effect on Positive Emotion
H4: SENTIMENT Analysis has a positive effect on Negative Emotion

3. Methodology

This research is quantitative which is intended to test whether WOM and SENTIMEN analysis have an effect on positive and negative emotions. Data collection was carried out using a questionnaire instrument which was distributed to 105 high school students using a questionnaire, from closed questions there were 10 positive emotions and 10 negative emotions obtained from the PANAS scale, and each emotion was given a scale from 1-10 and then from 105 answers. Respondents will be summed and will get the total results of positive emotions and negative emotions. Meanwhile, SENTIMENT analysis was obtained from Tweeters from 105 universities and using the tweeter program and natural language processing, so that it can distinguish words based on Positive, Neutral and Negative. While the other data is done by taking primary data to high school students in grades 11 and 12. And in the sampling, the technique used is convenience sampling where questionnaires are distributed and asked whether the high school students are from public high schools or public private high schools. or Private High School based on Religion and others.

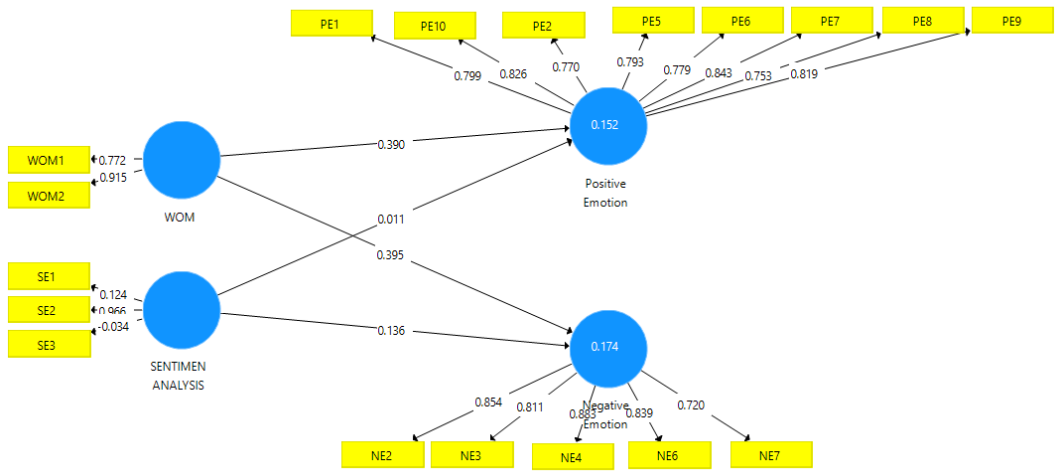
Data processing using PLS-SEM with the following stages:

1. **Outer Model**
   - Indicator Reliability (*Outer loading)*
   - Construct Reliability (*Cronbach alpha & Composite reliability)*
   - Construct/Convergent Validity (AVE)
   - Discriminant Validity (HTMT)
2. **Inner Model**
   - *Multicollinearity (VIF)*
   - Coefficient of Determinant (R^2)
   - *Predictive Relevan* Q^2
   - Q^2 *Predict*

4. Results and Discussion

After running PLS-SEM, the results are obtained as shown in Figure 4.1 below:

Figure 4.1
Outer Model



From figure 4.1, Outer Model has 0.152 positive emotion and 0.174 negative emotion.

	Negative Emotion	Positive Emotion_	SENTIME...	WOM_
NE3	0.811			
NE4	0.883			
NE6	0.837			
NE7	0.718			
PE1		0.799		
PE10		0.826		
PE2		0.769		
PE5		0.794		
PE6		0.780		
PE7		0.843		
PE8		0.753		
PE9		0.819		

Then reliability we see AVE > 0.5

	Composite Reliability	Average Variance E...
Negative Emotion	0.913	0.677
Positive Emotion_	0.934	0.637
SENTIMEN ANALYSIS_	0.585	0.514
WOM_	0.834	0.717

Then we see Discriminate Validity, namely HTMT < 0.85 so there is no indication of correlation between variables

	Negative ...	Positive E...	SENTIME...	WOM_
Negative ...				
Positive E...	0.224			
SENTIME...	0.240	0.141		
WOM_	0.500	0.467	0.114	

Then we will see Validity with Inner VIF, between 1-3 so that there is no Multicoliniarity

	Negative ...	Positive E...	SENTIME...	WOM_
Negative Emotion				
Positive Emotion_				
SENTIMEN ANALYSIS_	1.002	1.002		
WOM_	1.002	1.002		

Then R Square for Negative Emotion 0.174 and Positive Emotion 0.153, so it is concluded that the Cofficient of Determinate is Weak.

	R Square	R Square Adjusted
Negative Emotion	0.174	0.158
Positive Emotion_	0.153	0.136

Then test the effect and significance

	Original ...	Sample ...	Standard ...	T Statistic...	P Values
SENTIMEN ANALYSIS_ -> Negative Emotion	0.139	0.092	0.164	0.847	0.198
SENTIMEN ANALYSIS_ -> Positive Emotion_	0.020	-0.001	0.124	0.158	0.437
WOM_ -> Negative Emotion	0.400	0.405	0.091	4.396	0.000
WOM_ -> Positive Emotion_	0.391	0.407	0.088	4.449	0.000

H1: WOM has a positive effect on Positive Emotion
With a T-Statistic of 4.396 > 1.645 with a significant level of 0.05, WOM has a positive effect on Positive Emotion, and with a p value of 0.000 <0.05 so that it is proven to be significant.

H2: WOM has a positive effect on Negative Emotion
With a T-Statistic of 4.396 > 1.645 with a significant level of 0.05, WOM has a positive effect on Positive Emotion, and with a p value of 0.000 < 0.05 so that it is proven to be significant.

H3: SENTIMEN Analysis has a positive effect on Positive Emotion
With a T-Statistic of 0.847 < 1.645 with a significant level of 0.05, SENTIMEN Analysis has no positive effect on Positive Emotion, and with a p value of 0.1987 > 0.05 so that it is not significant.

H4: SENTIMEN Analysis has a positive effect on Negative Emotion
With a T-Statistic of 0.847 < 1.645 with a significant level of 0.05, SENTIMEN Analysis has no positive effect on Negative Emotion, and with a p value of 0.1987 > 0.05 so that it is not significant.

Q^2

	SSO	SSE	Q^2 (=1-S...
Negative Emotion	525.000	484.134	0.078
Positive Emotion_	840.000	785.799	0.065
SENTIMEN ANALYSIS_	210.000	210.000	
WOM_	210.000	210.000	

When viewed from Q2, Negative emotion and Positive Emotion have the ability to predict because > 0

Q^2

LM

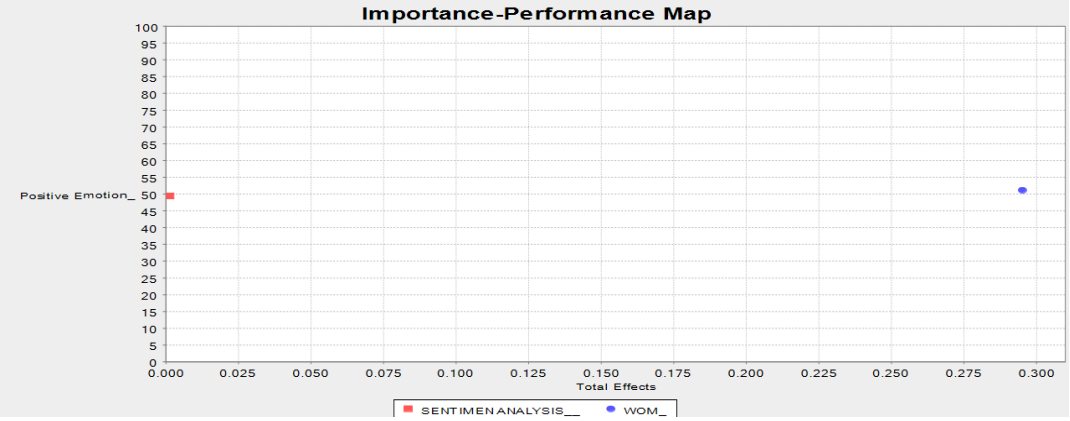
	RMSE	MAE	MAPE	Q^2_predict
NE6	2.415	1.978	77.339	0.030
NE2	2.124	1.717	64.603	0.119
NE7	2.330	1.943	68.599	0.051
NE4	2.323	1.908	81.912	0.078
NE3	2.602	2.190	75.146	0.031
PE9	1.728	1.194	26.234	-0.061
PE1	1.521	1.227	20.745	0.063
PE6	1.723	1.364	22.711	-0.028
PE2	1.625	1.305	23.856	0.014
PE8	1.996	1.522	29.806	-0.008
PE7	1.619	1.299	24.270	0.112
PE10	1.979	1.543	36.015	0.056

PLS

	RMSE	MAE	MAPE	Q^2_predict
NE6	2.405	1.987	77.264	0.038
NE2	2.137	1.733	66.671	0.108
NE7	2.343	1.953	70.041	0.041
NE4	2.324	1.908	82.625	0.077
NE3	2.553	2.159	74.165	0.067
PE9	1.698	1.180	25.615	-0.024
PE1	1.502	1.198	20.412	0.086
PE6	1.714	1.345	22.258	-0.016
PE2	1.586	1.280	23.454	0.060
PE8	1.975	1.476	28.827	0.013
PE7	1.600	1.295	24.426	0.133
PE10	1.945	1.529	35.631	0.088

Of the 13 indicators, for MAE LM > MAE LS as many as 12 indicators, it can be concluded that Positive Emotion and Negative Emotion have HIGH PREDICTION POWER.

Important and Performance Analysis (IPMA)



When viewed from IPMA, the SENTIMEN Analysis variable is important but still does not perform, while the WOM variable has performed, so Positive emotion and Negative emotion are influenced by WOM.

5. Discussion

In this study it can be seen that the effect of WOM on positive emotions is 0.390 and on negative emotions is 0.395, this indicates that negative WOM will have a greater effect on negative emotions, while sentiment analysis to positive emotions is 0.011 and to negative emotions is 0.138, this indicates that negative sentiments have a greater effect on negative emotions, so R2 for positive emotions is 0.152 and R2 for negative emotions is 0.174 so the university must be able to filter WOM and negative sentiment from traditional WOM and university social media or negative sentiment from social student media.

6. Conclusion

The influence of WOM in this study is from two sources, namely the influence of parents and the second is the influence of friends. Meanwhile, the SENTIMEN analysis was taken from 105 universities' social media twitter, while the emotional factor was taken from the PANAS scale. Primary data retrieval to 105 respondents from 11th and 12th grade high school students using Google forms, while secondary data SENTIMEN analysis uses python program to 105 universities with 100 tweets so that the tweet data taken is 10500 tweets, and by using natural language processing then positive, neutral and negative sentiments can be distinguished. Then data processing using PLS-SEM. And from the results of data processing, it was found that WOM had a positive

effect on positive emotion by R2 by 15.3% and negative emotion by R2 by 17.4%. SENTIMEN analysis had no effect on positive emotion and negative emotion.

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