

## Social Media Factors and Teen Gadget Addiction Factors in Indonesia

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### Abstract

*Social media users in Indonesia are growing rapidly since its emergence. In 2019, one of the largest social media platforms, Facebook has 3 billion users worldwide as well as 130 million users from Indonesia. Moreover, other social media such as Instagram also experienced significant growth with most of its users being teenagers. Massive use of social media is caused by more than 100 million active users using gadgets or smartphones to open apps such as social media. Widespread use of social media and gadgets not only has a positive impact but also negative impacts such as mental and behavioral disorders if the user is already addicted. Therefore, the need to know the factors that influence social media addiction and gadgets in Indonesia is necessary to prevent the occurrence of social media and gadget addiction. In this paper, the influence factors of social media addiction and gadgets in Indonesia are examined using several techniques such as data science, partial least square, and structural equation modeling. Research result: Time, Productivity and Relationships are factors that influence social media addiction and gadgets, whereas Mind is not a factor that affects social media addiction and gadgets.*

**Keywords:** *Social Media, Gadgets, Negative Impact*

## I. INTRODUCTION

Social media has been widely used all over the world, especially in Indonesia. This can be seen from one of the social media platforms, Facebook, which Indonesian users ranked fourth highest in the world in 2018 (Millward 2018). Similar to Facebook, another popular social media, Instagram, reaches 60 million users in Indonesia. The massive use of social media is caused by more than 100 million active users using gadgets or smartphones to open apps such as social media. The widespread use of social media and gadgets not only has a positive impact but also negative impacts such as mental and behavioral problems (Kempa 2015), and decreased academic motivation (Prabandari and Yuliati 2016) if users are already addicted. This latest negative impact is seriously a threat to children and adolescents (Ashwini Veronica and Samuel 2016). Therefore, the need to know the factors of social media addiction and gadgets in teenagers in Indonesia is necessary to prevent the occurrence of social media and gadget addiction. In this work, we conduct research on factors that influence social media addiction and gadgets, especially in Indonesia. This research contributes to practical problems and theoretical problems. For theoretical problems, we investigate the factors that influence addiction in the use of social media and gadgets whether there is a significant relationship between those factors with addiction. For practical problems, this study tries to provide best practice to stakeholders to prevent dependence on social media and gadgets. The outline of this paper is as follows: (1) Introduction, (2) Literature Study, (3) Research Methodology, (4) Results, (5) Discussion and (6) Conclusion.

### Literature Review

Based on prior research by Young et al about addiction of the internet (Young 2015), there are twenty questions or constructions that can indicate someone who is addicted to the internet. Based on twenty questions, we classify four categories like "time", "relationship", "productivity" and "thought". Time is defined by Sahin et al (2017) as preferring to spend much time on the internet including social media and gadgets and affect life dissatisfaction. Based on this definition, indicators Q1, Q2, Q5, and Q6 are categorized as time variables. Relationship is defined by Veronica (Ashwini Veronica and Samuel 2016) as the usage of social media and gadget can be influenced by relationship with friends, hence the user can easily use social media and gadget influenced by influencer. Based on this definition, indicator Q3, Q4, Q13 are categorized as relationship variables. Productivity is defined as the laziness of doing real-life activity as well as wasting much time for unimportant things (Prabandari and Yuliati 2016), hence indicator Q7, Q8, Q14 and Q15 are categorized as productivity variables. The last, Thought is defined as confidentially thought, negative thought, and fear thought of real-life. Hence indicator Q9, Q10, Q11, Q12 is categorized as thought variables. The remaining indicator: Q16, Q17, Q18, Q19, Q20 are categorized as social media and gadget addiction. Based on above explanation, Hypothesis is proposed as follow: H1: Time is positively related with Social Media or Gadget Addiction  
H2: Relationship is positively related with Social Media or Gadget Addiction  
H3: Productivity is positively related with Social Media or Gadget Addiction  
H4: Though is positively related with Social Media or Gadget Addiction

Four hypotheses are then observed whether there is correlation or not with social media addiction. Propose model of influence factors of social media addiction can be seen as follow:

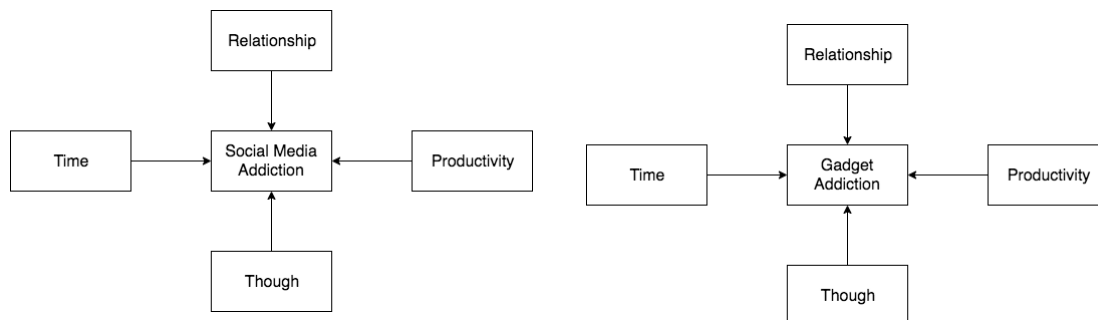


Figure 1. (Left) Influence Factors of Social Media Addiction propose model. The model consists of four factors that will be observed whether there is a relationship to social media addiction. (Right) Influence Factors of Gadget Addiction propose a model. The model consists of four factors that will be observed whether there is a relationship to gadget addiction.

## II. METODE

This study is based on quantitative method, which consists of data analysis based on statistical method. Our measurement or construct is derived from prior empirical research: Internet Addiction by Young et al (Young 2015). The construct was then modified and adjusted with condition in Indonesia. Final measurement model is in a five-point Likert-type scale ranging from “strongly disagree” to “strongly agree”. The question is then classified into several categories like “time”, “relationship”, “productivity” and “thought” based on deeply reading several prior research (Ashwini Veronica and Samuel 2016)(Buran Köse and Doğan 2019)(Şahin 2017). These classes then observed whether there is a significant relationship to social media and gadget addiction. All constructs of measurement are put on online form and spread out to selected audiences. In addition, additional information like age, sex, occupation, last education, and city is included in form information.

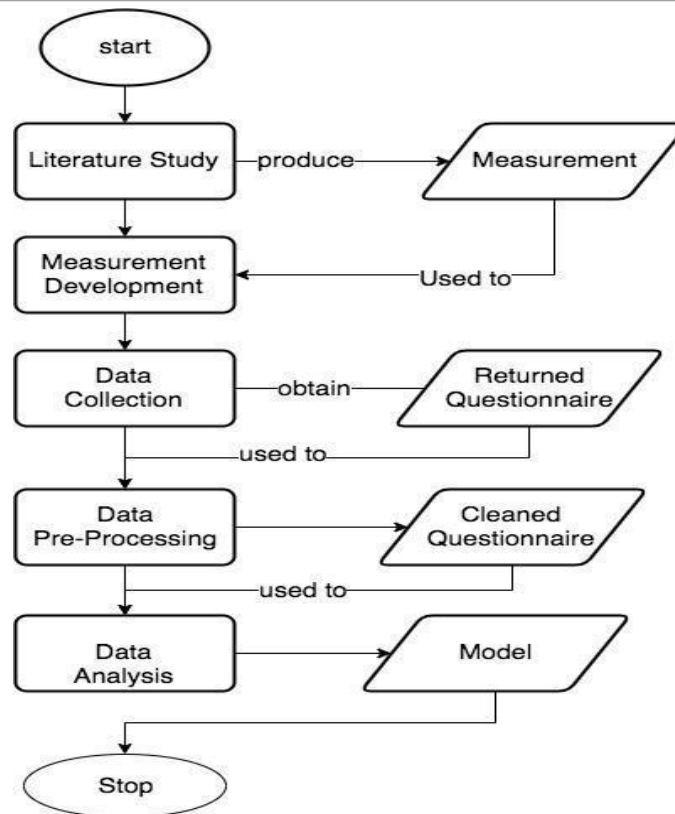


Figure 2. Research Methodology

The first step of research is to study literature by reading prior research papers including journal, conference paper, news then measurement or construct is established. Measurement is then modified and adjusted with the Indonesia environment. The next step is the measurement spread out to targeted audience then returned questionnaire in data collection. Then the questionnaire is used in data pre- processing to remove inappropriate data. The last step, cleaning data is used in data analysis to obtain model influence factors of social media and gadgets in Indonesia. Data is collected from respondents who have experience in using social media and gadgets. The criteria of respondents are having experience in using social media and gadgets, the average of using gadgets more than 6 hours per day, and the average of using social media more than 5 hours per day.

After gathering data, the data should be pre-processed in order to obtain cleaned data. We used data science techniques running on Python programming like feature selection (Ng 2004), and tabular pre- processing (Challenge and Scenes 2013) to select appropriate features used in data analysis. 18Jurnal Sistem Informatika (Journal of Information System), Volume 16, Issue 1, April 2020 In this research, combination of Structural Equation Modelling (SEM) (Hox and Bechger 1998) and Partial Least Square (PLS) (Hox 2010) is performed to accept and reject hypothesis. We used several variables output that can determine validity and reliability of a model based on prior research (Pratama et al. 2017) like Alpha Cronbach, Correlation, Average Variance Extracted, Discriminant Validity, Consistent Reliability, and others. In this research, a combination of Structural Equation Modelling (SEM) (Hox and Bechger 1998) and Partial Least Square (PLS) (Hox 2010) is performed to accept and reject hypotheses. We used several variables output that can determine validity and reliability of a model based on prior research (Pratama et al. 2017) like Alpha Cronbach, Correlation, Average Variance Extracted, discriminant validity, Consistent Reliability, and others.

III. RESULT AND DISCUSSION

**Data Collection**

After performing measurement development, we obtained twenty questions complete measurement that can be accessed in appendix A. All of the questions are derived from Young et al (Young 2015) strengthened by (Griffiths et al. 2016)(Kurniasanti et al. 2019) then modified based on condition in Indonesia. Based on literature study, the questions are classified into four categories: Time, Relationship, Productivity and Thought.

Sex	
- Male	- 65%
- Female	- 35%
Occupation	
- Student	- 70%
- Lecturer	- 20%
- Worker	- 10%
Age	
- 10 – 24 years old	- 70%
- Other	- 30%

**Table 1. Demography**

The data was collected on November 11th 2019 – November 20th 2019 from respondents who have experience in using social media and gadgets. We used data science techniques to select appropriate data. From 1782 returned questionnaires, the average of respondents is 27.34 years old with 1089 male and the rest are female. Most of the respondents are students with 890 audience, the others are lecturer, and workers. Most of the students are senior high school students with 713 data. We select merely student occupations for this work. Based on prior research, most addiction people are dominated from between ages 10 – 24 years old and also categorized as adolescent, hence we select only this audience, hence we omit other respondents. We also used L1 feature selection to apply penalty over coefficients that multiply each of predictors. After performing feature selection techniques as well as tabular data pre-processing, we obtained final cleaned questionnaire 385 data. This data is used in analysis.

**Social Media Addiction**

First step, we tested the construct whether feasible to be used using outer model analysis. because none of instrument lower than threshold 0.6, hence none of indicators or instrument should be deleted. We measure validity of model using Convergent Validity by utilizing Average Variance Extracted (AVE). Complete AVE score can be seen in Table 2.

Variable	Indicator	Loading Factor	AVE	CR
Time (H1)	Q1	0.622	0.602	0.856
	Q2	0.831		
	Q5	0.791		
	Q6	0.839		
Relationship (H2)	Q3	0.877	0.730	0.890
	Q4	0.861		
	Q13	0.824		
Productivity (H3)	Q7	0.555	0.667	0.776
	Q8	0.659		
	Q14	0.722		
	Q15	0.778		
Thought (H4)	Q9	0.758	0.667	0.889
	Q10	0.795		
	Q11	0.829		
	Q12	0.880		

**Table 2. Loading Factor Social Media Addiction**

In order to ensure our model is valid, we use additional measurement, discriminant validity and compare AVE square root with each instrument. For example, in Thought AVE square root (0.817) is greater than other, productivity AVE square root is also greater than others. Complete discriminant validity can be seen in Table 3. For ensuring our model reliability, we used two variables: Composite Reliability (CR) and outer loading. All of CR scores are greater than threshold 0.7, hence our model fulfills internal consistency reliability.

	Thought	Productivity	Relationship	Time
Thought	0.817			
Productivity	0.630	0.684		
Relationship	0.742	0.654	0.855	
Time	0.632	0.563	0.662	0.776

**Table 3. Discriminant Validity Social Media Addiction**

For the last step, a structural test using Structural Equation Modelling is performed to test hypothesis models. Bootstrap is performed to generate random sampling to our construct. Final result can be seen as follow:

Hypothesis	Path Coef	Sample Mean	STDEV	t	Sig
H1 □ AMSG	0.195	0.207	0.08	2.25	*
H2 □ AMSG	0.172	0.161	0.124	1.39	*
H3 □ AMSG	0.475	0.488	0.093	5.114	*
H4 □ AMSG	-0.09	-0.08	0.112	0.805	NS

**Table 4. Bootstrapping Social Media Addiction**

Based on computational using SEM techniques, hypothesis H4 (Thought) is rejected because it did not meet  $t > 1.972$  with significant level 0.01, 0.05 or 0.1. Other hypotheses, based on result, factors that influence social media addiction of adolescents in Indonesia are H1 (Time), H2 (Relationship), and H3 (Productivity).

### Gadget Addiction

Similar with social media addiction, the construct is evaluated whether feasible to be used using outer model analysis. because none of instruments lower than threshold 0.6, hence none of indicators or instruments should be deleted. We measure the validity of a model using Convergent Validity by utilizing Average Variance Extracted (AVE). For ensuring our model reliability, we used two variables: Composite Reliability (CR) and outer loading. All of CR scores are greater than threshold 0.7, hence our model fulfills internal consistency reliability. Complete AVE score can be seen in Table 5.

Variable	Indicator	Loading Factor	AVE	CR
Time (H1)	Q1	0.777	0.642	0.878
	Q2	0.831		
	Q5	0.782		
	Q6	0.815		
Relationship (H2)	Q3	0.922	0.780	0.914
	Q4	0.892		
	Q13	0.834		
Productivity (H3)	Q7	0.693	0.623	0.814
	Q8	0.782		
	Q14	0.666		
	Q15	0.746		
Thought (H4)	Q9	0.666	0.688	0.849
	Q10	0.709		
	Q11	0.808		
	Q12	0.867		

**Table 5. Loading Factor Gadget Addiction**

Similar with social media addiction, discriminant validity is also evaluated. Complete discriminant validity can be seen in Table 6.

	Productivity	Relationship	Thought	Time
Productivity	0.702			
Relationship	0.438	0.883		
Thought	0.469	0.722	0.767	
Time	0.566	0.549	0.609	0.802

**Table 6. Discriminant Validity Gadget Addiction**

For the last step, a structural test using Structural Equation Modelling is performed to test hypothesis models. Bootstrap is performed to generate random sampling to our construct. Final result can be seen as follow:

Hypothesis	Path Coef	Sample Mean	STDEV	t	Sig
H1 □ AMSG	0.119	0.117	0.091	1.13	*
H2 □ AMSG	0.405	0.404	0.093	4.365	*
H3 □ AMSG	0.346	0.355	0.15	2.773	*
H4 □ AMSG	-0.078	-0.072	0.111	0.700	NS

**Table 7. Bootstrapping Gadget Addiction**

### Discussion

From 1782 returned questionnaire, 1397 data is omitted and remaining 385 data because of several reasons: (1) the audience is not fulfilled the desired target (age, occupation). We omit occupations like civil servant, workers and others. We merely select students as an audience. (2) the audience fills the questionnaire multiple times, (3) the audience is not consistent with the answer. This filtering result is produced from L1 feature selection. Based on analysis of data, H4 (Thought) is rejected because it does not significantly affect social media and gadget addiction. The reason of rejected as follow: (1) defensive and confidential thought sometimes is not significantly affected to social media and gadget addiction, it could be because someone needs privacy on using his gadget or social media, (2) social media and gadget sometimes did not provide well information, hence the user can think negatively when accessing social media and gadget. H1 (Time) is accepted as a factor of influencing social media and gadget addiction because when someone abandons real-life activity and tends to use more social media and gadget, it can be categorized as addiction, resulting in spending much time in using gadget and social media. H2 (Relationship) is accepted as a factor of influencing social media and gadget addiction because sometimes the use of exaggerated social media and gadget in daily activities is influenced by colleagues or friends. H3 (Productivity) is accepted as a factor of influencing social media and gadget addiction because sometimes when people are unemployed, they tend to use their gadget or social media more than employed people hence resulting in addiction.

### IV. CONCLUSION

Social Media and Gadget addiction not only have positive impact but also have negative impact like mental or behavior problems, as well as decrease of academic motivation. Hence the requirement of knowing factors of social media and gadget addiction of adolescents in Indonesia

is required in order to prevent addiction of social media and gadget. We investigate influencing factors of social media and gadget addiction by constructing Partial Least Square and Structural Equation Modeling. The result, Time, Productivity and Relation are the factors of influencing social media and gadget addiction, meanwhile Thought is not the factor of influencing social media and gadget addiction.

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