

WhatsApp Stickiness in Indonesia: A Tale of Two Generations

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Abstract. This study examined factors influencing user stickiness towards WhatsApp among 160 Generation Y and 286 Generation Z users in Java, Indonesia. Drawing on prior technology adoption literature, a questionnaire was developed to assess the impact of hedonic value, utilitarian value, content quality, context quality, and system infrastructure on attitude and stickiness intentions. Data was analyzed using structural equation modeling. The results showed that hedonic value and system infrastructure positively influenced stickiness intentions indirectly through attitude for both generations. Content quality only influenced stickiness for Generation Y. The implications of these results for instant messaging platforms and limitations of the study are discussed.

Keywords: Instant Messaging, Generation Y, Generation Z, Mobile Application, Mobile Stickiness, Structural Equation Modelling, Whatsapp

1. Introduction

Personality significantly influences whether individuals embrace or reject technology, according to a previous study (Goren-Bar et al., 2006). Because the internet expands at such a rapid rate each year, the world has transformed drastically. Annually, an increasing number of individuals access the internet. This number increased by 7% during the initial quarter of 2018 (Kemp, 2018). Kemp (2018) estimates that out of the total population of 7.593 billion individuals, 4.021 billion (or 53 percent) utilize the internet. It is estimated that 3.5 billion individuals are engaged on social media platforms. In Asia Pacific, 47% of people use the internet on average. In Asia Pacific, 47% of people use the internet on average. Indonesia is the nineteenth highest in the world. This number is 3% higher than the average number of people who use the internet in Asia-Pacific countries like Fiji, Nepal, Cambodia, Bangladesh, and India (Kemp, 2017). Additionally, the expansion of social media occurs throughout Asia and the Pacific. Situated at the 21st rank, Indonesia's social media penetration stands at 44%, surpassing Asia Pacific by 4% and the global average by 3%. In comparison to India, Bhutan, Cambodia, Timor-Leste, Laos, and Myanmar, among others (Kemp, 2017). Smartphone applications are now indispensable to our daily existence. Mobile application personality characteristics are seldom investigated, despite the considerable interest in the psychology of inanimate objects (Tan et al., 2018). Smartphones are utilized by individuals for recreational purposes (Wang et al., 2014). Additionally, when people gather with friends via smartphones, the subjects of entertainment content can serve as intriguing conversation starters (Tan et al., 2018). Maintaining relationships is a critical function of cell phones, which are primarily utilized for communicating with companions (Hall & Baym, 2012). Users devote an average of 3 hours and 23 minutes per day to social media. 2.45 hours per day of linear, streaming, or VOD television. 19 minutes and one hour of streaming music. Social media consumes the majority of the time of Internet users (Kemp, 2018). An increasing number of internet users now incorporate social media into their daily routines, particularly on their smartphones. Both technologies have been effectively incorporated due to the fact that smartphones are more user-friendly, particularly for students (Giunchiglia et al., 2018). People now utilize a variety of social media sites, and a smartphone is one device capable of connecting to these sites. Smartphones enable individuals to communicate via social networking sites, text messages, voice calls, and emails (Wang et al., 2014). Instagram, Facebook, YouTube, Whatsapp, Facebook Messenger, WeChat, and QQ are utilized by the majority of social media consumers. The order of usage for instant messaging, conversation, and VOIP services is as follows: Facebook Messenger, WeChat, QQ, Skype, Viber, and additional platforms (Kemp, 2018). The top three messaging apps by the number of users are WhatsApp – 2 billion users, WeChat at 1.2 billion users, while Facebook Messenger has 1 billion users (Spectrum.io, 2022). WhatsApp is the number one messaging app in many Asian countries, such as Indonesia, Malaysia, and Hong Kong, just to name a few (Sinch Engage, 2023). Whatsapp, which is utilized by the majority of individuals in the Americas, South America, Russia, India, Southeast Asia, Central Asia, and the majority of Africa, is the most widely used instant messaging application in 128 countries. WhatsApp is a mobile rapid messaging platform that functions similarly to SMS on conventional mobile devices. WhatsApp utilizes internet data for communication, not credit. The absence of a character limit on WhatsApp eliminates concerns regarding the duration of messages. Enough internet data is sufficient for users (Winarso B., 2015). The average daily internet usage of Indonesians is 8 hours and 51 minutes. According to Kemp (2018), the most widely used instant messaging service in Indonesia is WhatsApp, Line, BBM (Blackberry Messenger), Facebook Messenger, Skype, and Wechat.

The key element to the success of a mobile application is stickiness (Lauren Drell, 2013). There are several variables that can influence stickiness or dependency in the use of a technology (especially instant messaging platforms) (C.-L. Hsu & Lin, 2016; Kumar Roy et al., 2014; Lien et al., 2017; J. C.-C. Lin, 2007; Tsao, 2014; Xu et al., 2018; Zhang et al., 2017). Stickiness refers to the capacity to effectively attract and keep clients and users (Zott et al., 2000). Stickiness to an application leads to the user's intention to reuse and extend the time or duration of use for the application. Increasing the number

of times, a user has visited or used the application and the duration of each visit refers to an increase in stickiness to the application (C.-L. Hsu & Lin, 2016). It is important to form a good understanding of the precursors and impacts of stickiness, especially from the perspective of the application user (J. C.-C. Lin, 2007). Therefore, this study wants to know what variables influence Generation Y and Z (Jiří Bláha et al., 2016; Knight, 2014; Ron Zemke et al., 2000) in Java Island (Banten, West Java, DKI Jakarta, Central Java, DI Yogyakarta, and East Java) to be stickier to Whatsapp. As well as knowing which variables have a significant influence on stickiness. Generation Z grew up with technology; they have almost never known a world without the internet and social media. Meanwhile, Generation Y sees the emergence and development of this technology (Szymkowiak et al., 2021). Generation Z is a highly connected generation, often referred to as 'digital natives' due to their early familiarity with technology. Generation Z is a generation that focuses on social and environmental issues (Munsch, 2021). They tend to have progressive attitudes, encourage change, and have a high concern for social and environmental issues. Meanwhile, generation Y is the first generation to grow up along with the development of the internet and digitalization (Szymkowiak et al., 2021). Generation Y is a generation that is optimistic and achievement oriented. They are known for their passion for creating meaning in their work and lives (Lissitsa & Kol, 2016). Generation Z is more multicultural than Generation Y. They are more open to diversity and social issues and tend to be more progressive in their political and social views (Kagan & Lissitsa, 2023). Generation Z was born in an era of increasingly advanced technology, so they have higher expectations for the latest innovations and technology. Meanwhile, generation Y is also open to innovation, but sometimes they are more inclined to be skeptical and consider the risks before adopting new technology (Kagan & Lissitsa, 2023; Lissitsa & Kol, 2016). Another difference is that generation Y is idealistic, while generation Z is pragmatic. In general terms, generation Y has characteristics such as having high self-confidence and being ambitious. That's why this generation finds it easier to achieve success at a young age. Compared to previous generations, generation Y is more open to facing change. Living in an era full of technology means that generation Y cannot escape from using gadgets. Almost everything is done digitally. The disadvantages of this generation are that they are prone to depression and stress and tend to have difficulty socializing (Lissitsa & Kol, 2016). Growing up in an all-digital environment makes Generation Z grow into individuals with diverse characteristics, both in terms of interpersonal and academic relationships. In general, they have characteristics such as: being technology-savvy so they can easily access the desired information; Compared to generation Y, generation Z tends to find it easier to socialize with other people. Open access to information makes this generation learn faster. They prefer to work in an environment that provides space for them to grow, be more creative, and be full of challenges. One type of company targeted by generation Z is a start-up (Munsch, 2021). The focus of this study is to formulate the following:

RQ1: What variables influence stickiness among WhatsApp users in generation Y and generation Z?

RQ2: What variables have a significant influence on stickiness among WhatsApp users in generation Y and generation Z?

2. Literature Review

Following are literature reviews:

Table 1. Literature Review

1	Author(s)	Mingli Zhang, Lingyun Guo, Mu Hu, Wenhua Liu
	Year	2016
	Title	Influence of Customer Engagement with Company Social Networks on Stickiness: Mediating Effect of Customer Value Creation
	Method	Data collected from 260 valid questionnaires was analyzed using structural equation modeling.
	Research Object	Sina's Enterprise Microblog user
	Result	The findings of this study indicate that conscious engagement, passion, and social contact have a direct and beneficial impact on the co-creation of consumer value.

		The findings of the conducted research indicate that customer value creation plays a mediating role in the relationship between customer engagement and stickiness. The stickiness of a product or service is significantly enhanced by customers' judgments of its functional value, which pertains to the usefulness and practicality of the offering, as well as its hedonic value, which relates to the pleasure and enjoyment derived from it.
	Conclusion	The findings from empirical research indicate that there is a direct and positive relationship between customer engagement and customer stickiness. Additionally, customer engagement also has an indirect influence on customer stickiness through the process of customer value generation. This study enhances prior research by including contemporary theories pertaining to consumer interaction, value co-creation, and stickiness. In addition to offering practical support to businesses in enhancing customer engagement and fostering user loyalty within their social media platforms.
2	Author(s)	Chin-Lung Hsu dan Judy Chuan-Chuan Lin
	Year	2016
	Title	Effect of Perceived Value and Social Influences on Mobile App Stickiness and In-App Purchase Intention
	Method	The Affect-Behavior-Cognition Model (ABC Model) posits that affect, behavior, and cognition are interconnected and influence one another in the context of human action. The model underwent empirical evaluation through the analysis of survey data collected from a sample of 485 users. The data that was gathered was subjected to analysis through the utilization of structural equation modeling (SEM) with the aid of AMOS 21.0. The supplied data will be assessed for univariate normality using skewness and kurtosis tests.
	Research Object	Taiwanese internet users who filled out surveys attached themselves to several sites that have high traffic, such as Sogi.com, Facebook, and Mobile01.
	Result	The findings of this study indicate that stickiness has a positive impact on the inclination to make a purchase of the program. This suggests that users of the application are less likely to engage in in-app purchases if they find the application to be engaging or enjoyable. The affective elements, which encompass emotions like as happiness and satisfaction experienced when utilizing an application, are notably influenced by utilitarian value and hedonic value. In-app purchases are contingent upon the level of stickiness for new users, whereas experienced users' propensity for in-app purchases is influenced by both stickiness and social identification.
	Conclusion	The study revealed that the factors of stickiness and social identification exert a significant impact on users' inclination towards engaging in in-app purchases. Significant disparities were observed between individuals who were already utilizing the application and those who had the capacity to do so, in terms of the factors that contribute to the establishment of user engagement and ultimately lead to in-app purchases.
3	Author(s)	Judy Chuan-Chuan Lin
	Year	2008
	Title	Online Stickiness: Its Antecedents and Effect on Purchasing Intention
	Method	434 questionnaire results were used to test the model created based on the empirical studies that have been carried out.
	Research Object	Internet users who visit the survey website or who receive links to newsgroups, chatrooms, and cyber communities
	Result	The findings of this study indicate that the level of user engagement on a website plays a crucial role in influencing individual decisions to engage in transactions on such website. The development of stickiness is contingent upon the attitudes of website users towards trust in a website and the intrinsic quality of the website content. The ability to create a website that effectively engages and retains user attention is a crucial factor in determining the success of a website. Enhancing the content and design elements of the website is expected to foster favorable user behavior, hence promoting user retention on the website.
	Conclusion	A website's ability to retain visitors is a key factor in driving their purchase decisions. Website managers should consider strategies to minimize the likelihood of users becoming overly attached to the site. User behavior, particularly their trust in the website and their perception of the quality of its content, plays a significant role in shaping this attachment.
4	Author(s)	Yi Qu, Andrzej Cie'slik, Shanshan Fang, Yuxiao Qing
	Year	2023

	Title	The role of online interaction in user stickiness of social commerce: The shopping value perspective
	Method	The empirical study uses STATA to analyze the sifted 183 questionnaires. The empirical analysis follows four steps. First, a descriptive analysis is displayed to demonstrate the sample features and user behavior toward social commerce platforms. Second, a reliability analysis is carried out to test the reliability of data. Third, the validity analysis is used to indicate the fitting degree between variables and the measured indicators. Fourth, the multiple regression analysis is used to test the research hypotheses. Finally, we study the robustness of our results using the structural equation modelling (SEM) approach.
	Research Object	Social commerce from the shopping value perspective
	Result	The results reveal that perceived ease of use and social interactivity can positively affect utilitarian shopping values and user stickiness, while perceived usefulness and social interactivity positively affect hedonic shopping values and then influence user stickiness. Hence, online interactions play a crucial role in strengthening user stickiness in social commerce. Therefore, for social commerce platforms, managers need to continue improving their perceived ease of use, perceived usefulness and social interactivity to attract and retain their users.
	Conclusion	This paper studied the effects of three online interaction factors, namely, perceived ease of use, perceived usefulness and social interactivity, as stimuli, on utilitarian shopping and hedonic shopping values. Furthermore, the importance of two shopping values for determining user stickiness was examined. The empirical results reveal that social interactivity produces the strongest impact among the three indicators. Moreover, social interactivity generates a significant and positive effect on both the hedonic shopping value and the utilitarian shopping value. Therefore, the interpersonal dimension is a direction that social commerce platform managers should pay more attention to. Furthermore, both the utilitarian shopping value and the hedonic shopping value generate significant and positive effects on user stickiness. As there is little difference between the significance of the utilitarian shopping value and the hedonic shopping value, social commerce platform managers should balance their effects in this regard to maximize user stickiness.
5	Author(s)	Yingying Ma
	Year	2023
	Title	Effects of interactivity affordance on user stickiness in livestream shopping : identification and gratification as mediators
	Method	In light of the stimulus–organism–response framework (S–O–R), a multiple-mediation model (identification and gratification as mediators) was established to examine the effect of interactivity affordance (S) on the user stickiness (R) of a sample of 489 Chinese livestream viewers. Structural equation modeling with bootstrapping estimation was performed to examine the mediating roles of identification (O-cognitive) and gratification (Oaffective).
	Research Object	Livestream shopping in China
	Result	The modeling results revealed that the relationship between interactivity affordance and user stickiness was partially mediated by identification combined with utilitarian gratification and fully mediated by identification combined with hedonic gratification. The findings stress the importance of categorizing gratifications. In addition, these findings offer new perspectives for understanding the effects of IT affordance on user stickiness.
	Conclusion	Collectively, the findings indicated that identification and gratifications (utilitarian and hedonic) mediate the relationship between interactivity affordance and user stickiness sequentially. The serial mediation model provides new insight into the mechanism through which interactivity affordance affects user stickiness. The findings indicate that interactivity affordance affects identification (a cognitive process) and leads to gratification (affective responses) and eventually consumer stickiness.

The variables that impact persistence are categorized into customer value creation, which comprises three variables: functional value, hedonic value, and social value, according to research by (Zhang et al., 2017). The objective of hedonic information systems is to provide their users with self-fulfillment, which is not dissimilar to engaging in enjoyable activities during periods of leisure or relaxation, but rather to utilizing the information system itself. The quantity of pleasure derived by the user from utilizing a hedonic system in order to attain a pleasant experience constitutes the system's value (van der Heijden, 2004). The research from (C.-L. Hsu & Lin, 2016; Ma, 2023; Qu et al., 2023) also use

hedonic value. The influence of adhesion on the hedonic value variable is mediated by attitude and satisfaction, according to the findings of (C.-L. Hsu & Lin, 2016). This finding contradicts the research conducted by (Ma, 2023; Qu et al., 2023), which compared the impact of hedonic value and utilitarian value on user retention. A utilitarian information system aims to increase efficiency while enhancing the task performance of its consumers (van der Heijden, 2004). Distinction in research subjects results in varying hedonic and utilitarian values for observed variables. Identification with the streamers is the observed variable that influences hedonic and utilitarian value, according to (Ma, 2023) research. This is because livestream purchasing is the subject of their research. It has been demonstrated that the individual who functions as a streamer has a significant impact on hedonic and utilitarian values. Perceived ease of use, perceived utility, and social interactivity are observed variables for hedonic value and utilitarian value, in contrast to (Qu et al., 2023). This is due to the fact that their research focuses on social commerce as it pertains to purchasing value. Hedonic and utilitarian value, on the other hand, were not impacted by perceived simplicity of use and usefulness, according to (Qu et al., 2023). It was discovered that stickiness influences and increases the desire to purchase an app. This demonstrates beyond a shadow of a doubt that users will not engage in in-app purchases for appealing or well-liked applications (C.-L. Hsu & Lin, 2016; Qu et al., 2023); the same holds true for streaming applications' stickiness (Ma, 2023). The research model proposed by (J. C.-C. Lin, 2007) and (C.-L. Hsu & Lin, 2016) posits that beliefs regarding the content variable, which comprises three dimensions (content, context, and mediated infrastructure through positive attitude and trust variables), impact the intention to adhere variable.

The model that will be used in this research will use hedonic value and utilitarian value variables (C.-L. Hsu & Lin, 2016; Ma, 2023; Qu et al., 2023), as well as content, context, and infrastructure variables from research (J. C.-C. Lin, 2007). This is done to be able to measure comprehensively, both from the application side and the user behavior side. In previous research, it was found that the application side, such as content, context, and infrastructure, provided partial support for stickiness. In addition, this step was taken to refine the model that had been developed in previous investigations. Plus, the research object is the WhatsApp smartphone application, which facilitates real-time communication. There is consensus that assessments related to infrastructure, content, and context are needed. This research also intends to determine variations in the use of instant messaging applications between the two generations, namely generation Y and generation Z.

3. Research Methodology

The objects of this research are WhatsApp application users in Indonesia who specifically live on the island of Java (Banten, West Java, DKI Jakarta, Central Java, DI Yogyakarta, and East Java). Apart from that, the respondents were generation Y (Millennial/Next Generation) who were born between 1980 and 1994 and generation Z (Generation M/Post-Millennials) who were born between 1995 and 2010 (Lissitsa & Kol, 2016). This research uses a survey method by distributing questionnaires online using Google Forms. The survey clearly articulates the goals and objectives of respondents, and how their data will be used. The survey gave the option to withdraw at any point without negative consequences for respondents. Anonymity and confidentiality of respondents had been guaranteed unless explicit consent for identification is obtained. This research ensures the survey instrument is unbiased and does not lead respondents to a particular answer. A pilot tests the survey with a small group was conducted to identify any potential issues, especially biases in question wording. A sample of the initial 30 participants who completed the research questionnaire was selected to be the pilot test. The samples or respondents needed for this research are respondents who use the WhatsApp application for at least one year; must live in an area on the island of Java (Banten, West Java, DKI Jakarta, Central Java, DI Yogyakarta, and East Java); generation Y (Millennial/Next Generation) born between 1980 and 1994, and/or generation Z (Generation M/Post-Millennials) was born between 1995 and 2010; respondents must also have an IM (instant messaging) application other than WhatsApp. The sampling

technique in this research uses purposive sampling, sampling based on the objectives and criteria that have been determined in this research. To measure the answers obtained from respondents, a 5-point Likert measurement scale was used, which can measure respondents' stickiness to the WhatsApp application. According to (F. Hair Jr et al., 2014) a minimum of 5 respondents per indicator will be sufficient for a normal distribution when a latent variable has several indicators. In this study, the number of indicators for all variables was 26. The minimum number of samples required for this research is $5 \times 26 = 130$ respondents per generation, considering that this research compares consumer behavior in two different generations, namely generations Y and Z. So, the minimum number of respondents in this research is 260 (130 respondents representing generation Y and 130 respondents representing generation Z). measure the answers obtained from respondents using a Likert measurement scale. The Likert scale can be used to measure a person's level of perception regarding the use of the WhatsApp application. This scale will consist of five levels of measurement. The basis for choosing to use a Likert scale with five levels of measurement is following previous research in Table 1, with the reason that using five levels of measurement is expected to make it easier for respondents to fill out the research questionnaire given because it only has five answer choices. Table 2 shows the levels of the Likert scale and the values used.

Table 2. Likert Scale Points

#	Answer	Code	Weight
1	Strongly Disagree	SD	1
2	Don't agree	DA	2
3	Neutral	N	3
4	Agree	A	4
5	Strongly agree	SA	5

This research will use structural equation modeling (SEM) as a method of data analysis and processing because it has latent variables. The questionnaire data that has been collected will be processed and analyzed using the SEM (Structural Equation Modeling) method. The data processing and analysis software that will be used is LISREL 8.70. Latent variables are variables that cannot be measured using numbers; examples include people's behavior, attitudes, feelings, motivation, etc. SEM is an extension of several multivariate analysis methods, such as multiple regression and factor analysis (F. Hair Jr et al., 2014). Many studies use SEM to study complex consumer behavior patterns that have many variables and relationships between variables (F. Hair Jr et al., 2014). The basis for choosing the SEM method in this research is that the aim of this research is to test and confirm theories that have been previously formed and test them on two different generations, namely generation Y and generation Z, not to develop new theories. The SEM (Structural Equation Modeling) method has several stages that need to be carried out (Setyo Hari Wijanto, 2008). The following is an illustration of the stages that will be carried out in this research:

1. The process of data preparation involves importing questionnaire data collected from Google Forms into Microsoft Excel for the purpose of cleaning and organizing. During the data cleaning phase, the researcher systematically evaluates each respondent's answers against pre-established criteria. These criteria include the requirement that respondents must reside in specific regions on the island of Java, namely Banten, West Java, DKI Jakarta, Central Java, DI Yogyakarta, and East Java, in order for their data to be considered valid and usable. The participants in this study were individuals belonging to Generation Y, also known as Millennials or the Next Generation, who were born between the years 1980 and 1994. Additionally, individuals from Generation Z, often referred to as Generation M or Post-Millennials, who were born between the years 1995 and 2010, were also included in the study. In order to participate in the study, it is required that respondents possess an instant messaging (IM) application, in addition to WhatsApp, and have a minimum of one year of experience

using WhatsApp. The researchers also examined the existing outliers within the dataset. Outlier data refers to data points that have distinct values that deviate significantly from the rest of the dataset.

2. Data preparation in SPSS Questionnaire data that has been cleaned in Microsoft Excel will be imported into SPSS to be prepared so that the data can be processed at the next stage.
3. Overall Model Fit Test (suitability of the entire model) In this research, the first stage of the overall model fit test was carried out with the aim of evaluating goodness-of-fit (GOF). GOF itself helps researchers identify whether the data obtained supports the overall model of the theory being built. Hair et al. (2010) group goodness-of-fit (GOF) into 3 parts, namely:
 - a. The absolute fit measure. The measure in question is utilized to assess the extent to which the correlation and covariance matrix's overall size and structural model can be predicted.
 - b. The incremental fit measure is a metric used to assess the improvement in model fit as additional variables are added to a statistical model. The measure serves to compare the research model with the fundamental model.
 - c. The parsimony fit measure is a statistical metric used in academic research. The metric employed to quantify the simplicity of a model is one that exhibits a high ratio of degrees of freedom to each degree of freedom.
 - d. The measurement model is a fundamental component in research methodology, particularly in the field of social sciences. It refers to the framework or structure used to assess and quantify latent constructs or Confirmatory Factor Analysis (CFA) enables researchers to evaluate the validity of measurement theories. The assessment of the appropriateness of the measurement model is conducted individually for each measurement model, which examines the connection between latent variables and observed variables. This evaluation involves examining the validity and reliability of the measurement model, as outlined by F. Hair Jr et al. (2014).
 - a. Validity test A variable can be said to have a good level of validity towards the construct or latent variable if the standardized loading factors (SLF) are greater than 0.5 and the t-value is greater than the critical value ≥ 1.96 F. Hair Jr et al. (2014).
 - b. Reliability test. Reliability is a level that shows that each indicator has high consistency in measuring its latent construct (latent variable). There are two formulas for calculating high or low reliability F. Hair Jr et al. (2014), namely:

$$\text{Construct Reliability} = \frac{(\sum \text{std loading})^2}{(\sum \text{std loading})^2 + \sum e}$$

$$\text{Variance Extracted} = \frac{\sum \text{std loading}^2}{\sum \text{std loading}^2 + \sum e}$$

According to Hair et al. (2010), a variable is considered to have good reliability if the construct reliability (CR) value shows ≥ 0.70 and the variance extracted (VE) value shows ≥ 0.50 .

- e. The topic of interest is the fit of a structural model. The assessment of the appropriateness of the structural model can only be conducted if the validity of the measurement model has been established F. Hair Jr et al. (2014). The objective of this stage is to provide a description or generate visual representations pertaining to hypotheses that have been established using latent variables and indicators. The utilization of model description and visualization techniques can contribute to the mitigation of mistakes and facilitate the examination of the interconnections among latent variables within the context of the research. The path diagram will be generated using the LISREL software. The utilization of a path diagram facilitates the visualization of the interconnections among latent variables and enables the examination of hypotheses in subsequent stages.

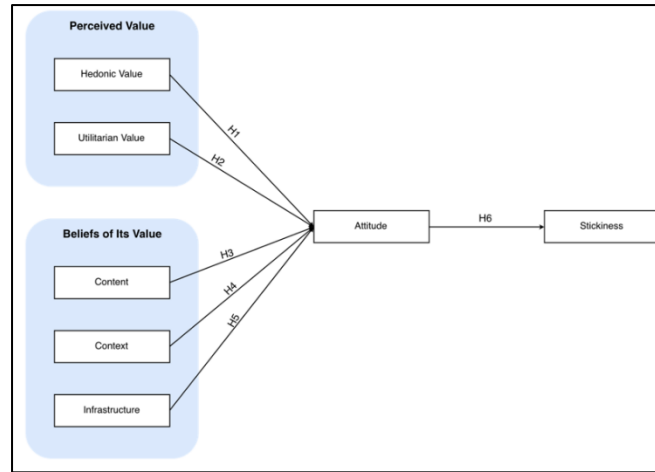


Fig.1: Research Model

The hypothesis of this research is as follows:

1. H1: Hedonic Value will influence Attitude
2. H2: Utilitarian value will influence Attitude
3. H3: Content will influence Attitude
4. H4: Context will influence Attitude
5. H5: Infrastructure will influence Attitude
6. H6: Attitude will influence Stickiness

Hedonic can be called pleasure-oriented (van der Heijden, 2004). The term "hedonic" is derived from the philosophical concept of hedonism, which posits that pleasure or happiness is the ultimate or primary good in life (Merriam-Webster, n.d.). Hedonic information systems have the aim of providing self-fulfillment for their users, which is closely related to activities carried out in their free or relaxed time as well as things that are fun to do while using the information system. The value of a hedonic system is the degree to which the user experiences a level of pleasure when using the system to obtain a pleasant experience (van der Heijden, 2004).

H1: Hedonic Value will influence Attitude.

Utilitarians can be called productivity oriented. Utilitarian systems have the goal of providing instrumental value to their users. Instrumental value means having a purpose external to the interaction between the user and the system, such as improving task performance. The goal of a utilitarian information system is to improve the task performance of its users while increasing efficiency (van der Heijden, 2004). User perceptions about the quality or usefulness of the information provided by an application (Davis, 1989).

H2: Utilitarian values will influence Attitude.

Content can be assessed based on the level of usefulness, completeness, clarity, actuality, accuracy, and conciseness of the software or application content (J. C.-C. Lin, 2007). User perception of context discusses the extent to which the interface design of an application is effective (Aladwani & Palvia, 2002).

H3: Content will influence Attitude.

Context can be assessed based on regularity, use of fonts, and appropriate color combinations used in the software/application user interface (J. C.-C. Lin, 2007).

H4: Context will influence Attitude.

Infrastructure. User perceptions about infrastructure discuss the efficiency provided by an application's infrastructure (Aladwani & Palvia, 2002). Infrastructure can be assessed from the level of ease of use, availability, and speed of loading content in the software or application (J. C.-C. Lin, 2007). H5: Infrastructure will influence Attitude.

Attitude can be defined as the positive or negative feelings of an individual when using a system, for example, the user's evaluative influence in using a system or application (Davis, 1989). The attitude felt by users of an application or system can be felt for a relatively long time (Oliver, 1980). Stickiness refers to the capacity of a business or platform to effectively attract and retain consumers and users (Zott et al., 2000). The level of stickiness exhibited by users towards an application is positively correlated with their intention to revisit the application and prolong their usage duration. The concept of enhancing the stickiness of an application involves augmenting both the frequency of user visits and usage instances, as well as the duration of each visit (C.-L. Hsu & Lin, 2016).

H6: Attitude will influence Stickiness.

Each indicator and variable in this research were formed based on previous research, namely (C.-L. Hsu & Lin, 2016; J. C.-C. Lin, 2007; Zhang et al., 2017). These indicators will be adapted from the object of this research, namely the WhatsApp IM (instant messaging) application. Table 3 is a table of variable indicators for each question in the research questionnaire.

Table 3. Questionnaire Variables and Indicators

#	Variables	Indicators		References
1	Hedonic Value	HV1	I feel happy using WhatsApp	(C. L. Hsu & Lin, 2016)
		HV2	I feel satisfied when using WhatsApp	(C. L. Hsu & Lin, 2016)
		HV3	I enjoy using Whatsapp	(C. L. Hsu & Lin, 2016)
2	Utilitarian Value	UV1	Using Whatsapp can help me to complete work, communicate and make transactions more quickly	(C. L. Hsu & Lin, 2016)
		UV2	Using Whatsapp can help me to complete work, communicate and make transactions more effectively	(C. L. Hsu & Lin, 2016)
		UV3	Using Whatsapp can increase success/productivity in working, communicating, and making transactions	(C. L. Hsu & Lin, 2016)
		UV4	Using WhatsApp can improve the quality of work, communication, and transactions	(C. L. Hsu & Lin, 2016)
3	Content	CT1	The content that WhatsApp has is useful	(J. C. C. Lin, 2007)
		CT2	Whatsapp has complete content	(J. C. C. Lin, 2007)
		CT3	The content that WhatsApp has is clear	(J. C. C. Lin, 2007)
		CT4	Whatsapp's content is current/actual	(J. C. C. Lin, 2007)
		CT5	Whatsapp's content is concise	(J. C. C. Lin, 2007)
		CT6	Whatsapp's content is accurate	(J. C. C. Lin, 2007)
4	Context	CX1	Whatsapp's appearance looks organized	(J. C. C. Lin, 2007)
		CX2	Whatsapp's display uses appropriate fonts	(J. C. C. Lin, 2007)
		CX3	Whatsapp's display uses an appropriate color combination	(J. C. C. Lin, 2007)
5	Infrastructure	IS1	WhatsApp is easy to use	(J. C. C. Lin, 2007)
		IS2	WhatsApp is always available when I want to use it	(J. C. C. Lin, 2007)
		IS3	Content in WhatsApp can be loaded quickly	(J. C. C. Lin, 2007)
6	Attitude	AT1	I can receive Whatsapp well	(C. L. Hsu & Lin, 2016)
		AT2	I like using WhatsApp	(C. L. Hsu & Lin, 2016)
		AT3	I feel happy using Whatsapp	(C. L. Hsu & Lin, 2016)
7	Stickiness	SQ1	I will spend more time on Whatsapp than any other instant messaging application	(C. L. Hsu & Lin, 2016)
		SQ2	I intend to spend more time on Whatsapp	(C. L. Hsu & Lin, 2016)
		SQ3	I use Whatsapp as often as I can	(C. L. Hsu & Lin, 2016)
		SQ4	I use Whatsapp every time I'm online	(C. L. Hsu & Lin, 2016)

The extent to which a statement accurately represents the construct it intends to assess is determined by validity tests. A measurement is considered genuine when the statements contained in the questionnaire accurately reflect the construct being assessed. This research employs factor analysis to assess its validity. A substantial number of variables' correlations and relationships can be examined using factor analysis (Sarstedt et al., 2017). Through the implementation of factor analysis, one can

ascertain the presence or absence of correlation among indicators, evaluate the capability of an indicator to represent a latent variable, and ascertain the validity and dependability of the acquired data (Naresh K. Malhotra, 2018). Table 4 presents the validity measures, including the corresponding values necessary for assessing the validity of the data.

Table 4. Validity Measures

Num.	Validity Measures	Value Required
1.	Kaiser Meyer-Olkin (KMO) Measure of Sampling Adequacy It is an index used to test the suitability of the analysis model.	A KMO value ≥ 0.5 indicates that the factor analysis is adequate (Naresh K. Malhotra, 2012).
2.	Bartlett's Test of Sphericity It is a statistical test used to test the hypothesis that variables are not correlated in the population.	A significant value test < 0.05 indicates that there is a significant relationship between variables (F. Hair Jr et al., 2014).
3.	Anti Image Matrices To predict whether a variable has an error regarding other variables.	By paying attention to the Measure of Sampling Adequacy (MSA) value on the anti-image correlation diagonal, The MSA value ranges from 0 to 1, with the following criteria: - The MSA value is 1, indicating that this variable can be predicted without error by other variables. - MSA value ≥ 0.50, indicating that the variable is still predictable and can be analyzed further. - MSA value ≤ 0.50, indicating that this variable cannot be analyzed further and must be removed from factor analysis. It is necessary to repeat the factor analysis calculations by removing indicators that have an MSA value ≤ 0.50 (F. Hair Jr et al., 2014).
4.	Factor Loading of Component Matrix It is the magnitude of the correlation of an indicator with the factors formed.	Factor Loading ≥ 0.50 indicates the validity criteria for a valid indicator (F. Hair Jr et al., 2014).

The performance of reliability testing is an essential procedure for ascertaining the degree of dependability exhibited by a study. The assessment of reliability can be determined by examining the degree to which participants responded to the research questionnaire in a consistent and stable manner (Naresh K. Malhotra, 2018). (F. Hair Jr et al., 2014) define reliability as the degree to which the variables being observed accurately represent the true value and do not contain any errors. This will demonstrate that repeatedly evaluated variables that are deemed reliable show greater consistency in comparison to measurements that are considered unreliable. Cronbach's alpha quantifies the correlation between the responses provided for every item within a given variable. Reliability is attributed to variables with a Cronbach's alpha value of 0.6 or greater (F. Hair Jr et al., 2014). The results of assessing the questionnaire's validity and reliability through an online distribution process utilizing Google Form are presented in Table 5. To conduct validity and reliability assessments, a sample of the initial 30 participants who completed the research questionnaire was selected. Among these participants, 7 individuals identified as members of Generation Y (Millennial/Next Generation), born between 1980 and 1994, and 23 individuals identified as members of Generation Z (Generation M/Post-Millennial), born between 1995 and 2010. The outcomes of the validity and reliability assessments conducted in this study are deemed satisfactory, as all the criteria for the tests of validity and reliability are fulfilled by scores that exhibit a tendency towards excellence for each variable under investigation.

Table 5. Validity and Reliability Pre-Test Results

No	Variable	Measurement Code	Validity Test					Reliability Test	
			KMO	.Sig	MSA	Factor Loading	Valid / Invalid	Cronbach's Alpha	Reliable / Unreliable
1	Hedonic Value	HV1	0,744	0	0,705	0,935	Valid	0,909	Reliable
2		HV2	0,744	0	0,825	0,896	Valid	0,909	Reliable

No	Variable	Measurement Code	Validity Test					Reliability Test	
			KMO	.Sig	MSA	Factor Loading	Valid / Invalid	Cronbach's Alpha	Reliable / Unreliable
3		HV3	0,744	0	0,721	0,929	Valid	0,909	Reliable
4	Utilitarian Value	UV1	0,75	0	0,764	0,913	Valid	0,92	Reliable
5		UV2	0,75	0	0,711	0,917	Valid	0,92	Reliable
6		UV3	0,75	0	0,771	0,861	Valid	0,92	Reliable
7		UV4	0,75	0	0,759	0,919	Valid	0,92	Reliable
8	Content	CT1	0,737	0	0,796	0,858	Valid	0,892	Reliable
9		CT2	0,737	0	0,798	0,69	Valid	0,892	Reliable
10		CT3	0,737	0	0,776	0,834	Valid	0,892	Reliable
11		CT4	0,737	0	0,698	0,856	Valid	0,892	Reliable
12		CT5	0,737	0	0,717	0,746	Valid	0,892	Reliable
13		CT6	0,737	0	0,682	0,909	Valid	0,892	Reliable
14	Context	CX1	0,686	0	0,702	0,809	Valid	0,732	Reliable
15		CX2	0,686	0	0,655	0,849	Valid	0,732	Reliable
16		CX3	0,686	0	0,71	0,804	Valid	0,732	Reliable
17	Infrastructure	IS1	0,668	0	0,789	0,759	Valid	0,762	Reliable
18		IS2	0,668	0	0,63	0,871	Valid	0,762	Reliable
19		IS3	0,668	0	0,641	0,859	Valid	0,762	Reliable
20	Attitude	AT1	0,701	0	0,851	0,836	Valid	0,87	Reliable
21		AT2	0,701	0	0,65	0,926	Valid	0,87	Reliable
22		AT3	0,701	0	0,666	0,914	Valid	0,87	Reliable
23	Stickiness	SQ1	0,857	0	0,832	0,915	Valid	0,921	Reliable
24		SQ2	0,857	0	0,836	0,913	Valid	0,921	Reliable
25		SQ3	0,857	0	0,887	0,88	Valid	0,921	Reliable
26		SQ4	0,857	0	0,878	0,888	Valid	0,921	Reliable

4. Result

4.1. Data Collection Analysis

The process of distributing the questionnaire took approximately two months, with a total of 476 respondents. Of all the respondents who filled out this research questionnaire, all of them answered the questions presented in the questionnaire. Respondents who answered the questions completely were filtered according to the criteria determined in Section 3. In order for the data to be considered genuine, respondents are required to reside in specific regions on the island of Java, namely Banten, West Java, DKI Jakarta, Central Java, Yogyakarta, and East Java. The participants of the study were individuals belonging to Generation Y, also known as Millennials or the Next Generation, who were born between the years 1980 and 1994. Additionally, individuals from Generation Z, often referred to as Generation M or Post-Millennials, who were born between the years 1995 and 2010, were included in the study. In order to participate in the study, it is required that respondents possess an instant messaging (IM) program, in addition to WhatsApp, and have a minimum usage experience of one year with WhatsApp. There were 30 respondents who did not meet the criteria required in this study, so the total number of respondents who passed was 446. The following is an analysis of the respondents used for this research.

4.2. Questionnaire Statement

This section will explain the results of the answers to each indicator that has been filled in by the respondent. The total indicators in this study were 26 indicators, which were divided into 7 latent variables. At this stage, an analysis of the answers to the respondents' statements was also carried out by finding the average of the respondents' answers that had been obtained using an interval scale: class interval = (highest value - lowest value): number of classes = (5-1): 5 = 0.80. From these calculations, the class interval in this study is 0.80, so the criteria for evaluating the average respondent's answers are in Table 4.

Table 6. Class Interval

Class Interval	Assessment Categories
$1.00 \leq a \leq 1.80$	Very Not Good
$1.80 < a \leq 2.60$	Not good
$2.60 < a \leq 3.40$	Enough
$3.40 < a \leq 4.20$	Good
$4.20 < a \leq 5.00$	Very good

Table 7. Distribution of Answers to the Combined Research Questionnaire

Measurement	1	2	3	4	5	Mean	Category
Hedonic Value							
HV1	4	15	136	184	107	3.84	Good
HV2	3	17	117	206	103	3.87	Good
HV3	3	16	112	204	111	3.90	Good
Total Mean						3.87	Good
Utilitarian Value							
UV1	2	12	50	197	185	4.23	Very good
UV2	5	6	62	210	163	4.16	Good
UV3	3	18	98	201	126	3.92	Good
UV4	3	16	104	200	123	3.95	Good
Total Mean						4.07	Good
Content							
CT1	1	11	98	236	100	3.94	Good
CT2	14	69	130	175	58	3.43	Good
CT3	1	18	85	232	110	3.96	Good
CT4	5	36	109	218	78	3.73	Good
CT5	2	14	86	222	122	4.00	Good
CT6	1	20	116	217	92	3.85	Good
Total Mean						3.82	Good
Context							
CX1	4	19	81	212	130	3.99	Good
CX2	0	12	60	227	147	4.14	Good
CX3	0	22	77	215	132	4.02	Good
Total Mean						4.05	Good
Infrastructure							
IS1	1	5	22	164	254	4.49	Very good
IS2	3	19	53	199	172	4.16	Good

Measurement	1	2	3	4	5	Mean	Category
IS3	2	13	51	201	179	4.21	Very good
Total Mean						4.28	Very good
Attitude							
AT1	1	7	41	206	191	4.29	Very good
AT2	4	20	111	175	136	3.93	Good
AT3	4	15	135	178	114	3.85	Good
Total Mean						4.03	Good
Stickiness							
SQ1	48	115	111	88	84	3.10	Good
SQ2	57	129	133	83	44	2.83	Enough
SQ3	53	95	130	114	54	3.04	Enough
SQ4	36	82	104	129	95	3.37	Enough
Total Mean						3.08	Enough

Table 7 is the result of the distribution of answers from 446 valid respondents who filled out this research questionnaire. The table presented above illustrates that the mean distribution of data or measures predominantly falls within the range of three to five values. This is evident across various variables, including hedonic value, utilitarian value, content, context, infrastructure, attitude, and stickiness. The distribution of these answers will be used to determine what factors influence the stickiness of the WhatsApp application in generation Y (Millennials/Next Generation) and generation Z (Generation M/Post-Millennials).

Table 8. Distribution of Research Questionnaire Answers among Generation Y Respondents

Measurement	1	2	3	4	5	Mean	Category
Hedonic Value							
HV1	2	7	51	96	52	3.90	Good
HV2	1	6	52	101	48	3.90	Good
HV3	1	2	49	106	50	3.97	Good
Total Mean						3.92	Good
Utilitarian Value							
UV1	1	4	20	95	88	4.27	Very good
UV2	1	1	26	106	74	4.20	Good
UV3	0	4	46	101	57	4.01	Good
UV4	1	7	50	98	52	3.92	Good
Total Mean						4.01	Good
Content							
CT1	0	5	41	126	36	3.92	Good
CT2	6	27	50	98	27	3.54	Good
CT3	1	5	35	118	49	4.00	Good
CT4	2	14	31	124	37	3.86	Good
CT5	2	4	30	122	50	4.02	Good
CT6	1	9	50	109	39	3.84	Good
Total Mean						3.86	Good
Context							
CX1	1	3	36	103	65	4.09	Good

Measurement	1	2	3	4	5	Mean	Category
CX2	0	3	25	123	57	4.12	Good
CX3	0	3	35	119	51	4.04	Good
Total Mean						4.08	Good
Infrastructure							
IS1	1	1	3	80	123	4.55	Very good
IS2	2	10	19	104	73	4.13	Good
IS3	1	4	17	107	79	4.24	Very good
Total Mean						4.31	Very Good
Attitude							
AT1	1	1	16	96	94	4.35	Very good
AT2	2	8	53	83	62	3.93	Good
AT3	1	3	64	90	50	3.88	Good
Total Mean						4.05	Good
Stickiness							
SQ1	13	39	54	56	46	3.39	Enough
SQ2	21	45	68	47	27	3.06	Enough
SQ3	18	30	66	60	34	3.29	Enough
SQ4	11	24	43	71	59	3.68	Good
Total Mean						3.36	Enough

Table 8 is the result of processing questionnaire answers for generation Y respondents. All generation Y respondents agree that the WhatsApp application can make all respondents happy. Performance and efficiency in carrying out activities also increase. The content on WhatsApp is also felt to be useful, complete, clear, precise, and up to date. The use and regularity of fonts, as well as the color combinations used by WhatsApp, are also considered harmonious. WhatsApp is also considered easy to use and can load existing content quickly. This makes the user's attitude positive or improved. Users from generation Y respondents also quite agree that they visit and use Whatsapp more often and extend the time or duration of using Whatsapp.

Table 9. Distribution of Research Questionnaire Answers among Generation Z Respondents

Measurement	1	2	3	4	5	Mean	Category
Hedonic Value							
HV1	2	8	85	88	55	3.78	Good
HV2	2	11	65	105	55	3.84	Good
HV3	2	14	63	98	61	3.84	Good
Total Mean						3.82	Good
Utilitarian Value							
UV1	1	8	30	102	97	4.20	Good
UV2	4	5	36	104	89	4.13	Good
UV3	3	14	52	100	69	3.91	Good
UV4	2	9	54	102	71	3.97	Good
Total Mean						4.05	Good
Content							
CT1	1	6	57	110	64	3.95	Good
CT2	8	42	80	77	31	3.34	Enough

Measurement	1	2	3	4	5	Mean	Category
CT3	0	13	50	114	61	3.93	Good
CT4	3	22	78	94	41	3.62	Good
CT5	0	10	56	100	72	3.98	Good
CT6	0	11	66	108	53	3.85	Good
Total Mean						3.78	Good
Context							
CX1	3	16	45	109	65	3.91	Good
CX2	0	9	35	104	90	4.15	Good
CX3	0	19	42	96	81	4.00	Good
Total Mean						4.02	Good
Infrastructure							
IS1	0	4	19	84	131	4.43	Very Good
IS2	1	9	34	95	99	4.18	Good
IS3	1	9	34	94	100	4.18	Very Good
Total Mean						4.27	Very Good
Attitude							
AT1	0	6	25	110	97	4.25	Very Good
AT2	2	12	58	92	74	3.94	Good
AT3	3	12	71	88	64	3.83	Good
Total Mean						4.00	Good
Stickiness							
SQ1	35	76	57	32	38	2.84	Enough
SQ2	36	84	65	36	17	2.63	Enough
SQ3	35	65	64	54	20	2.82	Enough
SQ4	25	58	61	58	36	3.09	Good
Total Mean						2.84	Enough

Table 9 is the result of processing questionnaire answers for generation Z respondents. All generation Z respondents agree that the WhatsApp application can make all respondents happy. Performance and efficiency in carrying out activities also increase. The content on WhatsApp is also considered useful, complete, clear, precise, and up to date. The use and regularity of fonts, as well as the color combinations used by WhatsApp, are also considered harmonious. WhatsApp is also considered easy to use and can load existing content quickly. This makes the user's attitude positive or improved. Users from generation Z respondents also quite agree that they visit and use Whatsapp more often and extend the time or duration of using Whatsapp.

4.3. Structural Equation Modeling (SEM) Data Analysis Results

The data collected in this research was further analyzed using the structural equation modeling (SEM) method. SEM data analysis calculations were carried out using LISREL software version 8.70. This software is used to test the relationship between the variables in the research and the conceptual framework that has been prepared. The calculation results using LISREL version 8.70 software will be attached to the attachment page. There are two research models in SEM analysis, namely the measurement model and the structural model.

4.3.1. Goodness-of-Fit Measurement Model Analysis Results

Analysis using the SEM method not only uses a single model fit test but also uses several fit index analyses that show the suitability between the data obtained and the model that has been prepared and tested on respondents belonging to generation Y (Millennial/Next Generation) born in the range of 1980 to 1994 and generation Z (Generation M/Post-Millennials) born between 1995 and 2010. The data used in the goodness-of-fit measurement model analysis for generation Y respondents was 160 data, where this amount of data was manually reduced or trimmed by 48 data (originally 208 data). This happened because these 48 data points caused the results of the goodness-of-fit measurement model analysis research on generation Y respondents to not pass the test. However, the amount of data in generation Z has not changed because it has met the goodness-of-fit measurement model test criteria, which is quite good.

Table 10. Results of Goodness-of-Fit Measurement Model Analysis on Generation Y Respondents

Goodness-of-Fit (GOF)	Acceptable level of fit	Result
Absolute Fit Measure		
Root Mean Square Error of Approximation (RMSEA)	RMSEA < 0.08	0.079
Incremental Fit Measure		
Comparative Fit Index (CFI)	CFI ≥ 0.95	0.96
Parsimony Fit Index		
Parsimony Normed Fit Index (PNFI)	$0 \leq \text{PNFI} \leq 1$	0.79

Table 11. Results of Goodness-of-Fit Measurement Model Analysis on Generation Z Respondents

Goodness-of-Fit (GOF)	Acceptable level of fit	Result
Absolute Fit Measure		
Root Mean Square Error of Approximation (RMSEA)	RMSEA < 0.08	0.078
Incremental Fit Measure		
Comparative Fit Index (CFI)	CFI ≥ 0.95	0.98
Parsimony Fit Index		
Parsimony Normed Fit Index (PNFI)	$0 \leq \text{PNFI} \leq 1$	0.82

Table 10 and Table 11 show 3 measures of goodness-of-fit obtained using LISREL 8.70 software in the measurement model, namely Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Parsimony Normed Fit Index (PNFI), that meet the respective test criteria to produce an acceptable fit. This shows that the goodness-of-fit test of this research is overall good, and this research is worth continuing.

4.3.2. Results of Measurement Model Analysis

The measurement model is an SEM model that focuses on each indicator for each variable and makes it possible to assess the validity of the variable (F. Hair Jr et al., 2014). Therefore, a validity and reliability analysis were carried out on the variables in this research. Figures 2 and 3 show the standardized solution path diagram for the measurement model for respondents from generations Y and Z. Figures 4 and 5 show the path diagram of t-values for the measurement model for respondents of generations Y and Z.

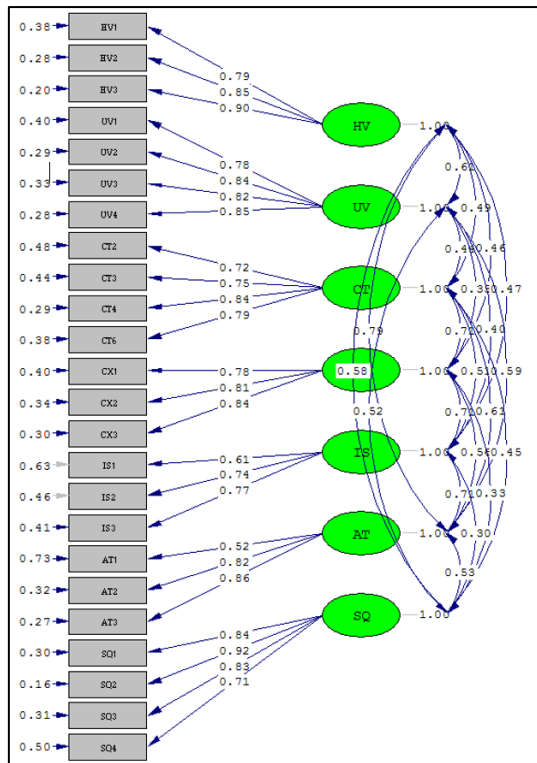


Fig.2: Measurement Model Path Diagram Standardized Solution pada Generasi Y

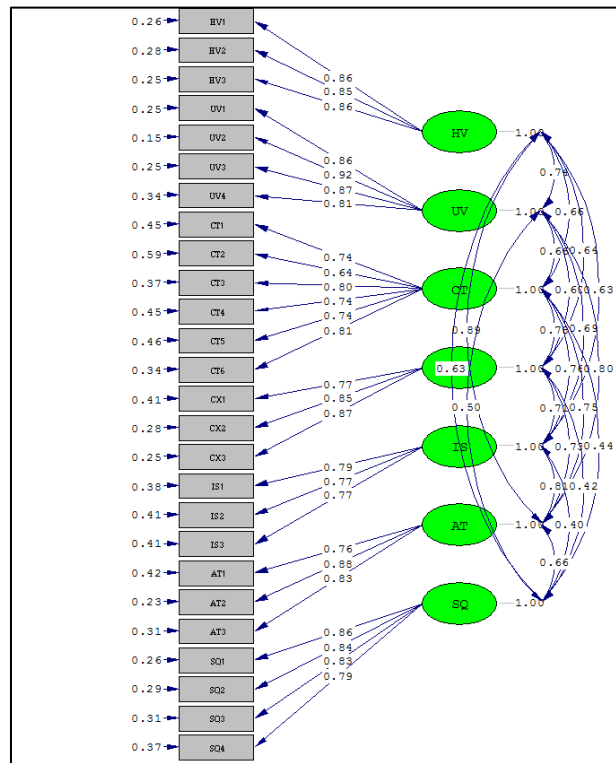


Fig.3: Measurement Model Path Diagram Standardized Solution pada Generasi Z

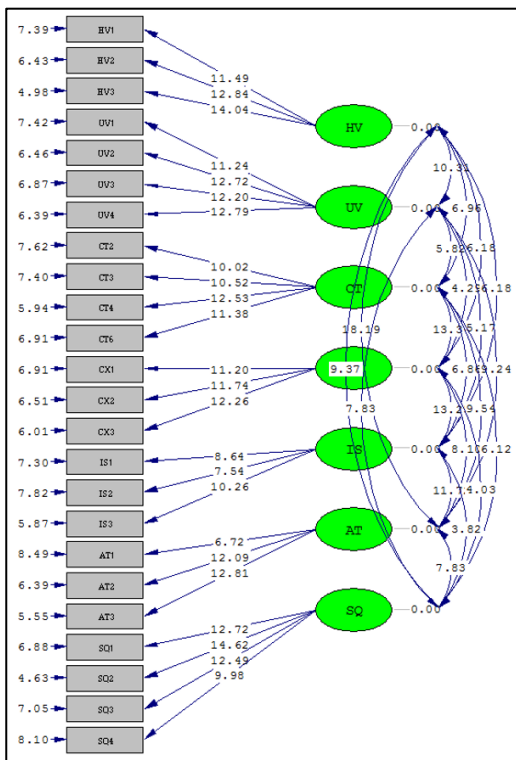


Fig.4: Measurement Model Path Diagram T-Values pada Generasi Y

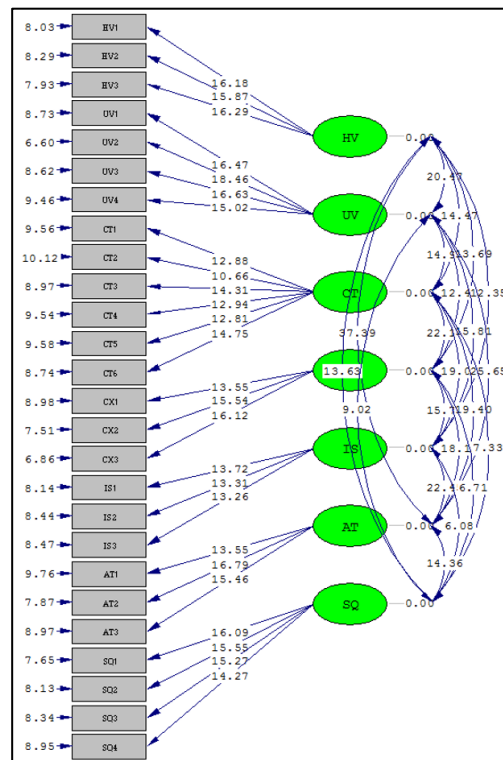


Fig.5: Measurement Model Path Diagram T-Values pada Generasi Z

Table 12. Validity Test Results of the Measurement Model Tested on Generation Y Respondents

Latent Variable	Measurement Code	Standardized Loading Factor ≥ 0.5	t-value ≥ 1.96	Conclusion
Hedonic Value	HV1	0.79	11.50	Valid
	HV2	0.85	12.84	
	HV3	0.90	14.03	
Utilitarian Value	UV1	0.78	11.23	Valid
	UV2	0.84	12.71	
	UV3	0.82	12.21	
	UV4	0.85	12.80	
Content	CT2	0.72	10.02	Valid
	CT3	0.75	10.54	
	CT4	0.84	12.52	
	CT6	0.79	11.37	
Context	CX1	0.78	11.04	Valid
	CX2	0.81	11.82	
	CX3	0.84	12.29	
Infrastructure	IS1	0.61	7.96	Valid
	IS2	0.74	10.29	
	IS3	0.77	10.39	
Attitude	AT1	0.52	6.69	Valid
	AT2	0.82	12.13	
	AT3	0.86	12.82	
Stickiness	SQ1	0.84	12.71	Valid
	SQ2	0.92	14.63	
	SQ3	0.83	12.49	
	SQ4	0.71	9.96	

*SLF=Standardized Loading Factors. SLF requirement ≥ 0.70 or 0.50 (F. Hair Jr et al., 2014; Igbaria et al., 1997). Requirements for the t value ≥ 1.96 .

Table 13. Validity Test Results of the Measurement Model Tested on Generation Z Respondents

Latent Variable	Measurement Code	Standardized Loading Factor ≥ 0.5	t-value ≥ 1.96	Conclusion
Hedonic Value	HV1	0.86	16.18	Valid
	HV2	0.85	15.87	
	HV3	0.86	16.29	
Utilitarian Value	UV1	0.86	16.47	Valid
	UV2	0.92	18.46	
	UV3	0.87	16.63	
	UV4	0.81	15.02	
Content	CT1	0.74	12.88	Valid
	CT2	0.64	10.66	
	CT3	0.80	14.31	
	CT4	0.74	12.94	
	CT5	0.74	12.81	
	CT6	0.81	14.75	
Context	CX1	0.77	13.55	Valid
	CX2	0.85	15.54	

Latent Variable	Measurement Code	Standardized Loading Factor ≥ 0.5	t-value ≥ 1.96	Conclusion
	CX3	0.87	16.12	
Infrastructure	IS1	0.79	13.72	Valid
	IS2	0.77	13.31	
	IS3	0.77	13.26	
Attitude	AT1	0.76	13.55	Valid
	AT2	0.88	16.79	
	AT3	0.83	15.46	
Stickiness	SQ1	0.86	16.09	Valid
	SQ2	0.84	15.55	
	SQ3	0.83	15.27	
	SQ4	0.79	14.27	

*SLF=Standardized Loading Factors. The SLF requirement is ≥ 0.70 or 0.50 (F. Hair Jr et al., 2014; Igbaria et al., 1997). Requirements for the t value ≥ 1.96 .

Tables 12 and 13 show that the required value of the Standardized Loading Factor (SLF) is ≥ 0.50 and the t value is ≥ 1.96 . It can be concluded that each indicator of the variables measured in research on generation Z is valid. After carrying out a validity test, the data will be analyzed further to test the reliability of each indicator for each variable in this research. Reliability tests were carried out on each construct. The results of reliability calculations using construct reliability are as follows:

Table 14. Reliability Results in Generation Y

#	Variable	Construct Reliability (CR)	Variance Extracted (VE)	Reliability Test
		CR ≥ 0.7 (Hair et al., 2010a)	VE ≥ 0.5 (Hair et al., 2010)	
1	Hedonic Value	0.88	0.71	Reliabel
2	Utilitarian Value	0.89	0.67	Reliabel
3	Content	0.85	0.60	Reliabel
4	Context	0.85	0.65	Reliabel
5	Infrastrcuture	0.74	0.50	Reliabel
6	Attitude	0.78	0.56	Reliabel
7	Stickiness	0.89	0.68	Reliabel

Table 14 shows that the construct reliability (CR) value of each variable meets the requirements, namely CR ≥ 0.7 . The variance extracted (VE) value also meets the requirements, namely VE ≥ 0.5 . Therefore, it can be concluded that the variables in this study that were tested on generation Y are reliable.

Table 15. Reliability Results in Generation Z

#	Variable	Construct Reliability (CR)	Variance Extracted (VE)	Reliability Test
		CR ≥ 0.7 (Hair et al., 2010)	VE ≥ 0.5 (Hair et al., 2010a)	
1	Hedonic Value	0.89	0.73	Reliabel
2	Utilitarian Value	0.92	0.75	Reliabel
3	Content	0.88	0.55	Reliabel
4	Context	0.80	0.57	Reliabel
5	Infrastrcuture	0.81	0.60	Reliabel
6	Attitude	0.86	0.68	Reliabel
7	Stickiness	0.85	0.60	Reliabel

Table 15 shows that the construct reliability (CR) value of each variable meets the requirements, namely $CR \geq 0.7$. The variance extracted (VE) value also meets the requirements, namely $VE \geq 0.5$. Therefore, it can be concluded that the variables in this study, which were tested on generation Z, are reliable.

4.3.3. Results of Goodness-of-Fit Structural Model Analysis

After all stages in the measurement model have been tested, the next stage is to carry out goodness-of-fit analysis on the structural model. The structural model that was tested on generation Z using LISREL software version 8.70 and SEM analysis calculations is shown in Table 15. The results of the goodness-of-fit analysis are shown there.

Table 16. Results of Structural Model Goodness-of-Fit Analysis in Generation Y

Goodness-of-Fit (GOF)	Acceptable level of fit	Result
Absolute Fit Measure		
Root Mean Square Error of Approximation (RMSEA)	$RMSEA < 0.08$	0.078
Incremental Fit Measure		
Comparative Fit Index (CFI)	$CFI \geq 0.95$	0.97
Parsimony Fit Index		
Parsimony Normed Fit Index (PNFI)	$0 \leq PNFI \leq 1$	0.80

Table 17. Results of Structural Model Goodness-of-Fit Analysis in Generation Z

Goodness-of-Fit (GOF)	Acceptable level of fit	Result
Absolute Fit Measure		
Root Mean Square Error of Approximation (RMSEA)	$RMSEA < 0.08$	0.079
Incremental Fit Measure		
Comparative Fit Index (CFI)	$CFI \geq 0.95$	0.98
Parsimony Fit Index		
Parsimony Normed Fit Index (PNFI)	$0 \leq PNFI \leq 1$	0.84

Tables 16 and 17 show goodness-of-fit measures, namely Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Parsimony Normed Fit Index (PNFI), which meet the test criteria. These three goodness-of-fit measures produce a level of suitability that is still acceptable, and this goodness-of-fit test can be declared overall good, and this research is worthy of continuing.

4.3.4. Results of Structural Model Analysis

A structural model is one or more dependent relationships that connect a construct to other constructs in a hypothetical model (F. Hair Jr et al., 2014). Structural models are useful for representing reciprocal relationships between variables. Based on the results of calculations using LISREL 8.70 software, it can be concluded that the structural model equation for generation Y and generation Z is as follows:

Generation Y

$$\eta_1 = 0.53*HV + 0.10*UV + 0.24*CT - 0.17*CX + 0.41*IS, \text{Errorvar.} = 0.16, R^2 = 0.84$$

(0.11)	(0.081)	(0.011)	(0.13)	(0.12)	(0.069)
4.69	1.27	2.29	-1.32	3.35	2.33

Interpretation:

The variations that occur in the attitude variable can be explained by hedonic value, utilitarian value, content, context, and infrastructure by 84%.

$$\eta_2 = 0.59*AT, \text{Errorvar.} = 0.65, R^2 = 0.35$$

(0.11) (0.11)
5.15 5.98

Interpretation:

The variations that occur in the stickiness variable can be explained by attitude by 35%.

Generation Z

$\eta_1 = 0.58*HV + 0.12*UV + 0.0052*CT + 0.059*CX + 0.30*IS$, Errorvar.= 0.10, $R^2 = 0.90$
(0.078) (0.069) (0.083) (0.075) (0.083) (0.030)
7.43 1.79 0.063 0.79 3.54 3.38

Interpretation:

The variations that occur in the attitude variable can be explained by hedonic value, utilitarian value, content, context, and infrastructure by 90%.

$\eta_2 = 0.65*AT$, Errorvar.= 0.58, $R^2 = 0.42$
(0.072) (0.078)
9.04 7.42

Interpretation:

The variation that occurs in the stickiness variable can be explained by attitude at 42%.

Information:

- ξ_1 (ksi 1) = Hedonic Value
- ξ_2 (ksi 2) = Utilitarian Value
- ξ_3 (ksi 3) = Content
- ξ_4 (ksi 4) = Context
- ξ_5 (ksi 5) = Infrastructure
- η_1 (eta 1) = Attitude
- η_2 (eta 2) = Stickiness

Next, this research carried out a comparative analysis of t-values and estimates, which are shown in Figures 6-9.

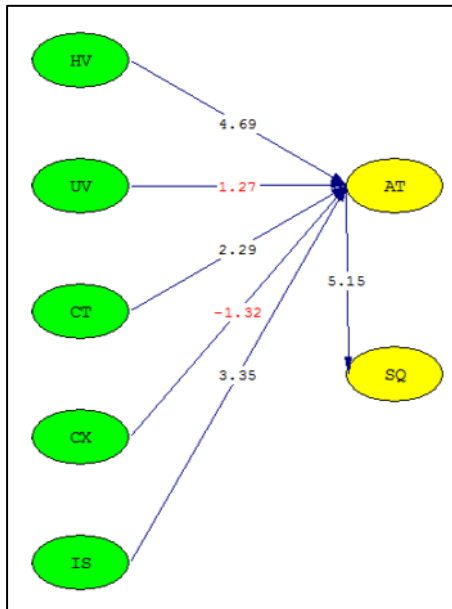


Fig.6: Path Diagram of T-Values in Generation Y

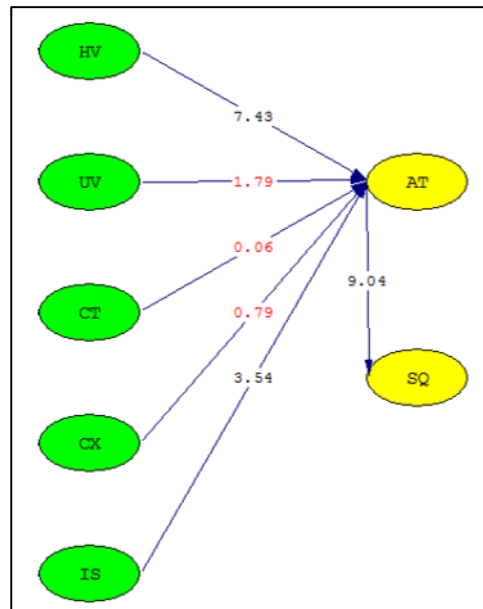


Fig.7: Path Diagram of T-Values in Generation Z

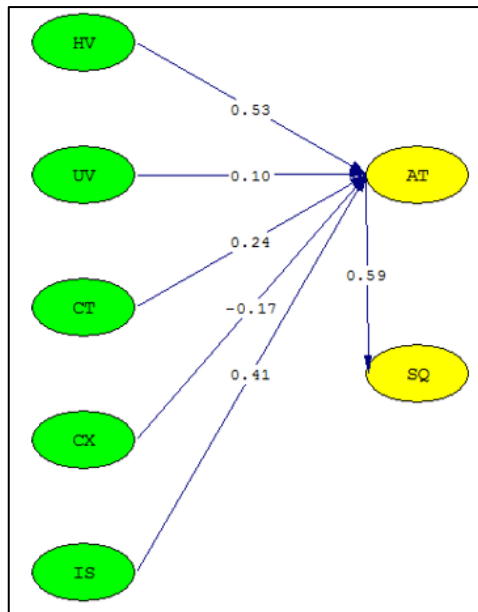


Fig.8: Path Diagram Estimates in Generation Y

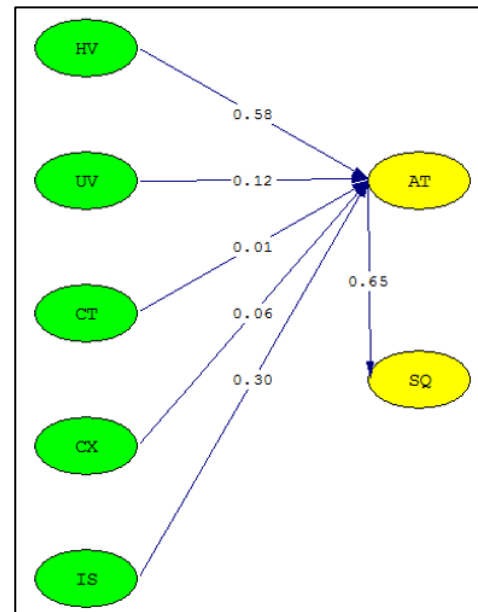


Fig.9: Path Diagram Estimates in Generation Z

Table 18. Results of Structural Model Analysis in Generation Y

Hypothesis	Path	Estimate	T-values	T-table	Conclusion
H1	Hedonic Value -> Attitude	0.53	4.69	1.96	Data supports H1
H2	Utilitarian Value -> Attitude	0.10	1.27	1.96	Data does not support H2
H3	Content -> Attitude	0.24	2.29	1.96	Data supports H3
H4	Context -> Attitude	-0.17	-1.32	1.96	Data does not support H4
H5	Infrastructure -> Attitude	0.41	3.35	1.96	Data supports H5
H6	Attitude -> Stickiness	0.59	5.15	1.96	Data supports H6

Table 19. Results of Structural Model Analysis in Generation Z

Hipotesis	Path	Estimate	T-values	T-table	Conclusion
H1	Hedonic Value -> Attitude	0.58	7.43	1.96	Data supports H1
H2	Utilitarian Value -> Attitude	0.12	1.79	1.96	Data does not support H2
H3	Content -> Attitude	0.01	0.06	1.96	Data does not support H3
H4	Context -> Attitude	0.06	0.79	1.96	Data does not support H4
H5	Infrastructure -> Attitude	0.30	3.54	1.96	Data supports H5
H6	Attitude -> Stickiness	0.65	9.04	1.96	Data supports H6

Hypothesis 1

In generation Y:

H1 tests the relationship between hedonic value and attitude. The research hypothesis in H1 is as follows: H1: Hedonic value will influence attitude.

The t-value obtained from the structural model calculation for H1 is 4.69. The observed value exceeds the critical value from the T-table, specifically 1.96. This finding provides evidence for the substantial impact of the hedonic value variable on the attitude variable. Hence, it can be inferred that the empirical evidence substantiates the assertion that the hedonic value construct exerts a statistically significant positive impact on the attitude construct.

In generation Z:

H1 tests the relationship between hedonic value and attitude. The research hypothesis in H1 is as follows:
H1: Hedonic values will influence attitude.

The t-value obtained from the structural model calculation for H1 is 7.43. The observed value exceeds the critical value from the T-table, specifically 1.96. This finding provides evidence for the substantial impact of the hedonic value variable on the attitude variable. Thus, it can be inferred that the empirical evidence substantiates the assertion that the hedonic value construct exerts a substantial and positive impact on the attitude construct.

Both generations have the same habits, where enjoyment is the determining factor in using an application. Both generations grew up in an era full of technology, making it easy for them to choose their favourite applications. Both generations have a very high level of adaptability to applications; therefore, they can accept WhatsApp well. Compared to previous generations, Generation Y and Generation Z are more open to change. Although Generation Y is sometimes sceptical of new things, that doesn't apply to this application. It can be seen from the data that enjoyment of using the application is the main factor in using WhatsApp.

Hypothesis 2

In generation Y:

H2 tests the relationship between utilitarian values and attitude. The research hypothesis in H2 is as follows:

H2: utilitarian values will influence attitude.

The t-value obtained from the structural model calculation for H2 is 1.27. The observed value is less than the critical value from the T-table, specifically 1.96. This finding demonstrates that utilitarian values do not exert a substantial impact on attitude. Hence, it can be inferred that the empirical evidence does not substantiate the assertion that the utilitarian value construct exerts a favorable impact on attitude.

In generation Z:

H2 tests the relationship between utilitarian values and attitude. The research hypothesis in H2 is as follows:

H2: utilitarian values will influence attitude.

The t-value obtained from the structural model calculation for H2 is 1.79. The observed value is less than the critical value from the T-table, specifically 1.96. This finding demonstrates that utilitarian values do not exert a substantial impact on attitude. Thus, it may be inferred that the empirical evidence does not substantiate the claim that the utilitarian value construct exerts a favorable impact on individuals' attitudes.

Even though both generations enjoy using the WhatsApp application, they do not want the application to be used as a communication tool to complete work. They really like to clarify the line between work and personal life. This is to prevent these two generations from experiencing depression and excessive stress. Therefore, the use of WhatsApp is intended for use in personal life, communicating with family, friends and relatives. Regarding productivity and quality of work, they usually use other applications prepared by the Company, such as email, ZOOM Meeting, Microsoft Teams, and so on. Especially for generation Z who likes to target start-up companies as their place of work.

Hypothesis 3

In generation Y:

H3 tests the relationship between content and attitude. The research hypothesis in H3 is as follows:

H3: Content will influence attitude.

The t-value obtained from the structural model calculation for H3 is 2.29. The observed value exceeds the critical value from the T-table, specifically 1.96. This finding demonstrates that the content

of information exerts a substantial impact on individuals' attitudes. Hence, it can be inferred that the empirical evidence substantiates the assertion that the content variable exerts a favorable impact on attitude.

In generation Z:

H3 tests the relationship between content and attitude. The research hypothesis in H3 is as follows:

H3: Content will not influence attitude.

The t-value obtained from the structural model calculation for H3 is 0.06. The observed value is less than the critical value from the T-table, specifically 1.96. This finding demonstrates that the impact of content on attitude is not substantial. Hence, it can be inferred that the empirical evidence does not substantiate the assertion that the content variable exerts a favorable influence on attitude.

This hypothesis is the only one that has a different influence between the two generations. When we talk about social media, there is so much content circulating on social media applications, including WhatsApp. Content that can be easily disseminated by users can be useful information, but it can also be a boomerang for those who receive it. The content on WhatsApp, especially for users in Indonesia, is very diverse. WhatsApp also often becomes a tool for spreading hoaxes. For those who lack knowledge of filtering information, they can easily fall for false information and spread it with the "Forward" feature. The Baby Boomers and Generation X generations, who came before these two generations, frequently engage in this. Generation Y can easily sort out which information is useful for them. They still have the concern of reading content submitted by other users. They think that maybe the information they receive could be useful, even though the information is a hoax. Unlike Generation Z, content on WhatsApp is considered unacceptable. They question the accuracy of the information passing around on WhatsApp; this is the reason they don't like using WhatsApp. Generation Z is a generation that focuses on social and environmental issues. They tend to have a progressive attitude, encourage change, and have a high concern for social and environmental problems. They are not happy if WhatsApp is used as a tool to spread hoaxes.

Hypothesis 4

In generation Y:

H4 tests the relationship between context and attitude. The research hypothesis in H4 is as follows:

H4: Context will influence attitude.

The t-value obtained from the structural model calculation for H4 is -1.32. The observed value is less than the critical value from the t-table, specifically 1.96. This finding demonstrates that contextual factors do not exert a substantial impact on attitude formation. Hence, it may be inferred that the empirical evidence does not substantiate the assertion that contextual variables exert a favorable impact on attitude.

In generation Z:

H4 tests the relationship between context and attitude. The research hypothesis in H4 is as follows:

H4: Context will influence attitude.

The t-value obtained from the structural model calculation for H4 is 0.79. The observed value is less than the critical value from the T-table, specifically 1.96. This finding demonstrates that the influence of context on attitude is not statistically significant. Hence, it may be inferred that the empirical evidence does not substantiate the assertion that contextual variables exert a favorable influence on attitude.

The appearance of WhatsApp is considered unattractive for these two generations. The choice of font and colour combination for this application is considered boring for both generations. Dominated by green, the application's appearance is monotonous compared to other social media applications. Both generations prefer a minimalist but not monotonous appearance, such as on Instagram, TikTok, and others.

Hypothesis 5

In generation Y:

H5 tests the relationship between infrastructure and attitude. The research hypothesis in H5 is as follows:

H5: Infrastructure will influence attitude.

The t-value obtained from the structural model calculation for H5 is 3.35. The observed value surpasses the critical value from the T-table, specifically 1.96. This finding provides evidence of a strong correlation between the infrastructure variable and the attitude variable. Hence, it can be inferred that the empirical evidence substantiates the assertion that the infrastructure factor exerts a substantial and beneficial impact on the attitude factor.

In generation Z:

H5 tests the relationship between infrastructure and attitude. The research hypothesis in H5 is as follows:

H5: Infrastructure will influence attitude.

The t-value obtained from the structural model calculation for H5 is 3.54. The observed value exceeds the critical value from the t-table, specifically 1.96. This finding provides evidence that the infrastructure variable exerts a substantial impact on the attitude variable. Hence, it can be inferred that the empirical evidence substantiates the assertion that the infrastructure variable exerts a noteworthy beneficial impact on the attitude variable.

The ease of using WhatsApp is one of the determining factors for the interest of these two generations. Apart from being easy, this application is also light to use; it doesn't slow down the user's device. For these two generations, who have been technology savvy for a long time, this application is popular because of its availability. Generation Z was born in an era of increasingly advanced technology, so they have higher expectations for the latest innovation and technology. This is what makes WhatsApp popular.

Hypothesis 6

In generation Y:

H6 tests the relationship between hedonic value and stickiness. The research hypothesis in H6 is as follows:

H6: Attitude will influence stickiness.

The t-value derived from the structural model computation for H6 is 9.04. The observed value surpasses the critical value obtained from the T-table, particularly 1.96. This discovery offers empirical support for the significant influence of the attitude variable on the stickiness variable. Therefore, it can be deduced that the empirical data supports the claim that the attitude variable has a significant positive influence on the stickiness variable.

In generation Z:

H6 tests the relationship between hedonic value and stickiness. The research hypothesis in H6 is as follows:

H6: Attitude will influence stickiness.

The t-value obtained from the structural model calculation for H6 is 9.04. The observed value exceeds the critical value from the T-table, specifically 1.96. This finding provides evidence for the substantial impact of the attitude variable on the stickiness variable. Hence, it can be inferred that the empirical evidence substantiates the assertion that the attitude variable exerts a notable positive impact on the stickiness variable.

WhatsApp, which is a social media application, is easy and light and has become one of the most popular applications. These two generations often open this application to build communication with those closest to them. Even though they are individualists, they still like to use WhatsApp. As often as possible, they will open this application, even just to check whether there are new notifications or not. Not infrequently, WhatsApp is also used as a short notepad for those who need to note down important

things. On WhatsApp, users can open a chat with themselves as a reminder of important notes. For these two generations, who have a lot of activities with their gadgets, this is really needed by them.

4.4. Discussion

The results obtained from the analysis of the structural model suggest that the variable denoting hedonic value has a positive and statistically significant effect on attitude. This discovery is consistent with the results of a previous investigation (Hsu & Lin, 2016) that establishes a positive correlation between attitude and the hedonic value construct. Hedonism, or pleasure and happiness, is the sole fundamental virtue in existence (Merriam-Webster, n.d.). Hence, individuals may develop a positive attitude due to the positive emotions and enjoyable experiences they derive from utilizing WhatsApp. This study demonstrated that the utilitarian value variable does not exert a statistically significant influence on the attitudes of WhatsApp users belonging to generations Y and Z. This discovery is in opposition to the results of a previous investigation (C.-L. Hsu & Lin, 2016) that established a positive correlation between attitude and the utilitarian value variable. In contrast, respondents are divided into two distinct categories, according to a study (C.-L. Hsu & Lin, 2016): actual users, who have not made any in-app purchases, and potential users, who have engaged in such transactions. The analysis results from the actual user group do not support the results of this research, but the analysis results from the potential user group support and are in line with this research. This can happen because all users, both generations Y, Z, and other generations, will feel helped and increase the efficiency of communication carried out via Whatsapp. By using an IM (instant messaging) type application, all users who use it will feel helped in terms of efficiency in communication. The efficiency mentioned is that every WhatsApp application user will be able to complete work, communicate, and make transactions more quickly. This is believed to help the human communication process. With WhatsApp, the communication process becomes shorter and easier. When compared with the previous method, direct communication can only be done face-to-face, at the same time and place. So, effectiveness and performance regarding work, communication, and transactions should increase with any IM application, including WhatsApp. In this research, the content variable has a significant positive influence on the attitude of generation Y respondents towards using WhatsApp. This is in line with research (J. C.-C. Lin, 2007). The positive relationship between content and attitude does have a correlation among generation Y respondents because generation Y tends to need to use an application that has useful, precise, and concise content. If the content is right, and generation Y users can feel that the content offered by Whatsapp is very influential on their attitude, Using WhatsApp can create a positive attitude among its users (generation Y). This is also reinforced by the statement (Jeffrey F. Rayport & Bernard J. Jaworski, 2001), which states that content is the king. As with generation Z respondents, the results of this research show that content does not have a significant influence on generation Z. This could happen because the content owned by WhatsApp is felt to be less complete than other IM platforms, such as Line, Telegram, etc. WhatsApp is an IM that only has standard or basic features that its users can use to improve their communication. The features of WhatsApp are voice calls, video calls, status, sending voice messages, documents, photos, videos, location, and contacts. Unlike other IM platforms, which have the standard features mentioned above and other features such as timelines, news, job openings, shopping for certain products, comics, games, and many other features, Generation Z feels that the variety of features and activities that can be carried out by one IM application can make them feel happier and have positive feelings towards that application. In this study, context did not have a significant influence on attitude in generations Y and Z. This contradicts research (J. C.-C. Lin, 2007) which indicates that context and attitude have a substantial positive correlation. This may occur due to the subjective nature of UX objectives, which pertain to the user's emotions or sentiments (Punchoojit & Hongwarittorn, 2017). (Thurston, 1991) asserts that a considerable number of facets pertaining to design evaluation are inherently subjective. Users of the WhatsApp application is also unable to modify or customize fonts, themes, or display colors. This differs from alternative instant messaging (IM) applications that grant

users the ability to customize themes, typefaces, colors, and displays to suit their personal tastes. Another factor to consider is that the interface design of the WhatsApp application has undergone modifications since its inception until Facebook acquired it in 1998. This causes the context variable to have a negative influence on attitude for respondents from generation Y, and for respondents from generation Z, context does not have a significant influence on attitude. This research proves that infrastructure has a significant positive influence. The infrastructure referred to in this research includes ease of use, availability, and speed in loading content offered on the Whatsapp software or application, which can make generation Y and Z respondents have a positive attitude or positive feelings toward using the application. In this research, the attitude variable was proven to have a very significant positive influence on the stickiness of generation Y and Z respondents who use the WhatsApp application. The positive feelings generated, as well as those felt by the user, will make the user reuse it, extend the time or duration of using the WhatsApp application, and retain the user to continue using and using the WhatsApp application more intensively. By understanding the interdependencies among variables, social media platforms such as WhatsApp can utilise this knowledge to retain users' interest. Given the following limitations, it is beneficial to proceed with caution when analysing the findings of this research. First, this study was conducted online using a self-report scale to measure research variables. Second, geographically limited sample and cross-sectional research design. Nevertheless, results were consistent with other related research and thus enhanced confidence in the findings. Therefore, managers can use this information to enhance the stickiness of their sites.

5. Conclusion

In conclusion, this study provides empirical insights into the factors driving WhatsApp stickiness among Generation Y and Z users in Indonesia. The findings indicate that hedonic value and perceived system infrastructure play an important role in shaping attitudes and intentions to continue using WhatsApp for both generations. Notably, content quality only influenced stickiness for Generation Y users, suggesting generational differences in priorities and preferences. These results have practical implications for enhancing user retention by improving hedonic features and ensuring robust infrastructure. Limitations of this study include the geographically limited sample and cross-sectional research design. Future studies can build on these findings by exploring moderating effects, incorporating additional theoretical constructs, and investigating stickiness drivers for other generational cohorts. Overall, this research makes a useful contribution to the nascent literature on user stickiness in instant messaging platforms.

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