



The Moderating Role of Personalization on Attitude-Emotion-Behavior (AEB) Model

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Abstract

Although push notifications have become an important business communication tool, the effect of such technologies on eco-friendly companies remains unclear. This study aims to fill this gap by investigating how smartphone users' attitude toward push notifications affects their behavior toward such companies. Three important findings emerged based on Smart-PLS statistical results from a study of 100 Indonesian smartphone users. First, smartphone users' attitudes toward push notifications significantly and positively influence their emotional value. Second, emotional value strongly affects users' behavioral responses. Third, personalization moderates the relationship between attitude toward push notifications and emotional value and between emotional value and behavioral response. The findings of our study extend the current research repertoires on push notifications and offer a clear direction for future research and managerial suggestions.

Keywords: *Push-notifications, Attitude, Emotion, Personalization, Behavioral response.*

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INTRODUCTION

The modern lifestyle is regarded as stressful and fast-paced. However, people involved in a chaotic and busy life believe that this demanding situation is the way to achieve success, and fast responses are required (Roonan, 2022) as well as instantaneous communication (Barber, 2021). To maintain their lifestyle, people use smartphones as a tool that helps them to communicate and exchange information (Mastroianni, 2020). Maghazei and Steinmann (2020) believe communication improves autonomous and informed decision-making. As a result, by August 2023, global smartphone adoption had reached 6.92 billion, or nearly 86% of the world's population owned and used smartphones (Bank My Cell, 2023). Park (2020) regards this situation as a great business opportunity, as smartphones offer various Internet-based features that help businesses channel sales and purchase transactions between companies and customers. Among the features of smartphones, scholars regard push notifications - automatic personalized promotions or news from businesses (Lowry et al., 2016) - to be one of the most important as they help companies distribute relevant and tailored information (Pan et al., 2015; Firdaus et al., 2019) that improves customers' intention to buy (Lee et al., 2017). Accordingly, push notifications are predicted to generate USD 36 billion in revenue by 2030 (Singh, 2023). According to the Asian Development Bank 2023 report, this staggering revenue is closely related to the phenomenal Asian e-commerce growth. This report suggests that two ASEAN countries, Singapore and Indonesia lead the chart with more than a 30% increase in e-commerce sales. In Indonesia, the two biggest e-commerce businesses, Tokopedia and Gojek utilize push notifications to increase their online sales and enhance customers' online experiences based on location (Barus, 2024).

This trend shows that push notifications have become a necessary tool for businesses and have subsequently attracted strong consumer behaviorist interest. Consumer behaviorist scholars also maintain that push notifications offer multiple benefits. For example, they increase the usage of an app and establish new habits (Kunkel et al., 2023), they increase purchase intention (Tiffany et al., 2020) and bidding success (Marz et al., 2021), they improve communication between businesses organizations and customers (Anjum et al., 2020), and they support customer consumption patterns (Wheatley & Ferrer-Conill, 2021). At the same time, scholars have found that situational factors are responsible for push notification adoption success. These factors include content (Tiffany et al., 2020), frequency (Wohllebe et

al., 2021), context (Dou et al., 2021), and personal factors such as cognitive experience (Riaz et al., 2022), rewards (Kunkel et al., 2023), functions (Cheng et al., 2022) and risk (Gavilan & Martinez-Navarro, 2022). They also include psychology, such as emotional experience (Riaz et al., 2022), attitude and perception (Awad & El-Shihy, 2014), fear of missing out (Clor-Proell et al., 2022), motivation (Kunkel et al., 2023) and demographics, such as income, education, and status (Dale et al., 2019), gender, age and occupation (Okoshi et al., 2018). In sum, the benefits of push notifications affect customers' intention to use such notifications (Lavury & Susandi, 2020).

Despite these many findings, Khudoyberdieva (2020) suggests that psychological antecedents are the most important components in marketing. Specifically, Gavilan and Martinez-Navarro (2022) propose that among psychological factors, our understanding of the role of emotion in the push notification phenomenon is still far from complete. This is because the concept of emotion is a complex construct that is responsible for many different behavioral outcomes (Herjanto et al., 2021a). As a result, Gavilan and Martinez-Navarro (2022) urge future researchers to prioritize their investigations on the role of emotion in the push notification phenomenon. Apart from two older studies conducted by Kolsaker and Drakatos (2009) and Zohra (2011), more recent studies on technology adoption (i.e., Lalicic & Weismayer, 2016; Martinez-Ruiz et al., 2017; Zhang & Xu, 2020) generally suggest that emotion is an antecedent of attitude, which further determines individuals' behavior. According to these authors, attitude is a product of individuals' positive or negative appraisal of exposed stimuli. That is, when individuals positively appraise stimuli, they may experience positive emotions and vice versa. Although the relationship between emotion and attitude is robust and well-proven, Ting et al. (2022) and Shi et al. (2023) argue and prove that this relationship exists in two ways. In other words, attitude is also responsible for generating various emotions. For example, when individuals have a positive attitude toward something, they may evaluate stimuli more favorably, and therefore, such positive evaluation will produce positive emotions and vice versa. Despite this understanding, existing scholars have not tested this relationship in the context of push notifications. Thus, to answer Gavilan and Martinez-Navarro's (2022) call above, this study aims to provide a better picture of this phenomenon by examining the role of attitude and emotion in response to push notifications.

Al-Nabhani et al. (2022) suggest that personalization is crucial in a modern service-oriented society and is a key component in the success of newer technology adoption. Interestingly, other than the study by Tiffany et al. (2020), investigations on the moderating role of personalization in the

context of push notifications are very scarce. According to Marakas (2023), the employment of a moderating variable in empirical research is crucial as it helps researchers to see beyond what is happening between two variables and explain why it is or is not happening. Thus, following Tiffany et al's (2020) call, this study aims to investigate the moderating role of personalization in the context of push notifications, specifically in the new proposed relationship of attitude–emotion–behavior, to gain better insights into customers' responses to push notifications.

Indonesia is one of the most promising e-commerce centers in the world (We Are Social, 2021) and it has made extensive use of push notifications to support the country's businesses (Buildwith, 2023). In 2022, Indonesian e-commerce businesses noted that more than 60% of their push notifications effectively reached their market (Bizbridge, 2022). However, despite this significant effectiveness, most studies on push notifications in Indonesia have been conducted in non-eco-friendly industries, including education (Wahyuningsih & Romadiana, 2020), parking services (Ilham et al., 2020), banking (Inaku & Imaroh, 2022) and restaurants (Ignacia et al., 2018). Studies directly targeting eco-friendly companies are absent. Thus, the study aims to extend the existing literature by investigating the push notification phenomenon in eco-friendly companies in the Indonesian context. Understanding this phenomenon has two important benefits. On a smaller scale, this understanding may help businesses develop strategies to promote eco-friendly products, build stronger customer commitment, and encourage word-of-mouth. On a larger scale, the findings can provide alternative consumption options, educate about the importance of the environment for human survival, and more importantly encourage customers to adopt more pro-environment behaviors (Garzon et al., 2018)

LITERATURE REVIEW

Herjanto et al. (2023) define attitude as the degree to which an individual evaluates exposed stimuli positively or negatively. In other words, attitude is a mental process that classifies objects and events (Mamuda & Peni, 2022) and determines individual feelings toward people, conditions, situations, or objects (Minikutty & Nair, 2016). In the context of push notifications, Izquierdo-Yusta et al. (2015) found that attitude determines cellphone users' willingness to receive and adopt push notification information. That is, the more positive customer attitudes are toward push notifications, the more likely customers will adopt push notifications. Previous studies found that adopting push notifications can generate

different emotions (i.e. Gavilan & Martinez-Navarro, 2022, Westermann, 2017). For example, when push notifications offer positive information that is essential to their lives, customers tend to experience positive emotions, such as happiness and joy (Gavilan & Martinez-Navarro, 2022). In such situations, customers prefer value push notifications and utilize them as a guide to better purchasing experiences. (Geyik, 2019), and accordingly, it improves customers' communication and relationship with a brand (Kunkel et al., 2023). Further, Gavilan and Martinez-Navarro (2022) suggest that when customers have a strong brand relationship, they often feel encouraged to get to know this brand further and are willing to click through push notifications. For example, when customers who are committed to green products receive push notifications about recent developments or promotions of these products, they tend to feel happy as they regard the push notifications as facilitating their values and they therefore click through them. Accordingly, we hypothesize that:

H1: Attitude towards push notifications influences emotional value.

In contrast, push notifications are also responsible for negative emotions. Specifically, when push notifications are sent at an inappropriate time or too frequently, or if the content of such notifications is irrelevant to customers (Voit et al., 2016), they can be regarded as annoying, dull, tiresome, and the cause of a high level of discomfort (Westermann, 2017). This further generates anger (Pham et al., 2016), which can result in customers ignoring, canceling, or turning off such notifications (Aharoni et al., 2020). Gavilan and Martinez-Navarro (2022) explain that such negative experiences can cause customers to feel a high level of stress and be overwhelmed, leading them to further disconnect from the brand. For example, when customers who are invested in green products receive a push notification providing non-environmentally friendly product information, they tend to feel frustrated as they view the push notification as interrupting their daily activities and wasting their time, and more importantly, they may feel disrespected by the brand involved. As a result, these customers are inclined to swipe away such push notifications. Thus, we predict that:

H2: Emotional value influences behavioral response.

In the context of information technology, the concept of personalization is generally referred to as the brand's ability to tailor information content based on customers' characteristics to improve the brand's performance (Aksoy et al., 2023) and the customer's experience (Aksoy et al., 2021). According to Tong et al. (2020), mobile device features, such as push notifications, allow brands to maintain customer-brand relationships by providing highly customized information based on a customer's location, timing, search behavior, and companionship. Such

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personalized information tends to improve their ability to make more efficient decisions (Maghazei & Steinmann, 2020). Scholars argue that in these circumstances, customers tend to become more confident in accepting such personalized information (Lei et al., 2022). This affects their attitude to information (Zhang et al., 2021), which in turn, generates further specific emotions. Accordingly, we assume that:

H3a: Personalization moderates the relationship between attitudes toward push notifications and emotional value.

According to Wald et al. (2021), when processing personalized information, customers need to be able to activate and operate their learning properties, including their cognitive ability and emotional ability as their two main important learning bases, to fully understand the information. The degree of this ability leads to different levels of self-relevance when engaging with such information (Deng et al., 2021). For example, when consumers with a high learning ability receive personalized information from push notifications, they may feel such promotional information is relevant to them. Accordingly, these customers experience emotional arousal and are excited or curious about processing this information, and accordingly, they tend to find out more about such information by clicking through push notifications. Figure 1 presents a brief conceptual framework of the moderating role of personalization in the relationship between attitude, emotion, and push notification behavioral responses. Therefore, we hypothesize that:

H3b: Personalization moderates the relationship between emotional value and behavioral response.

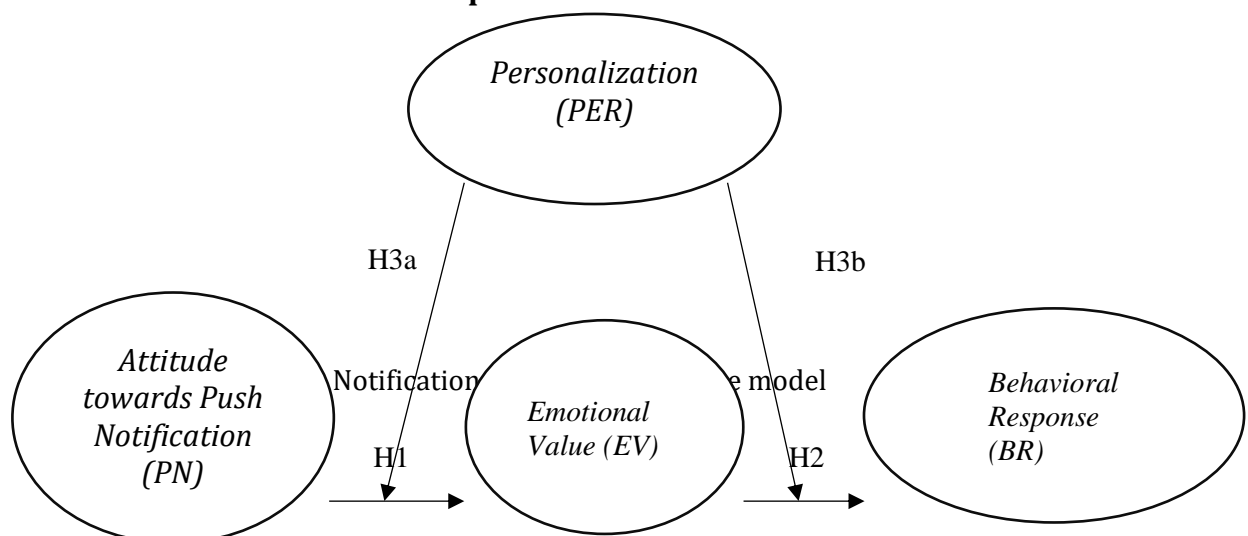


Figure 1. Conceptual Framework

METHODS

Research Design

This quantitative research is exploratory, aiming to explore the new proposed attitude-emotion-behavior relationship in the context of eco-friendly companies' push notifications. Quantitative research uses numbers and measurable data to examine phenomena and their interactions, focusing on understanding correlations between variables (Robbani et al., 2024).

Variables and Measurement

All the constructs included in this study were measured by a five-point Likert scale ranging from 1 to 5, where 1 refers to "strongly disagree" and 5 to "strongly agree." Six attitude items were borrowed from Gorransson et al. (2016), four emotional items were adopted and modified from Olate-Pascual et al. (2016), six items to measure personalization were adjusted from Pappas et al., (2017) and Mo et.al. (2023) and finally, four items to measure behavioral response were taken from Aramendia-Muneta and Olate-Pascual (2019). To guarantee the accuracy of the adopted items, this study followed Herjanto et al. (2020) and Herjanto and Hendriana's (2020) double translation procedure. First, the questionnaire was translated into Indonesian by a professional translator, and then the Indonesian version of the questionnaire was translated back to English by one of the authors.

Population and Sampling

The data collection process was conducted between 14 April 2023 and 16 May 2023. A total of 106 respondents participated in this process, however, 6 respondents were dropped because they submitted incomplete answers, or they had not received or interacted with push notifications from green industries in the past few weeks. Thus, a total of 100 (94.3%) usable responses were gathered and further analyzed by Smart-PLS. According to Gefen et al. (2000) and Chin (1998), the minimum sample size for PLS software should be a minimum of 10 times the number of items in the most complex construct. In our study, both attitude and personalization have six items, making them the most complex construct. Based on Gefen et al. (2000) and Chin's (1998) argument above, the minimum sample size required for this study is 60 (6 times 10). Thus, for a sample of 100, this study satisfies the minimum sample size requirement. A brief overview of our respondents' characteristics is presented in Table 1.

Table 1. A Brief Overview Of Respondents' Characteristics.

Characteristics	Total	Percentage
Gender		
Male	27	27%
Female	73	73%
Occupation		
Students	12	12%
Employees	72	75%
Self-employed	13	13%
Income		
Less than Rp. 1M/month	2	2%
Between Rp 1M and Rp. 5M/month	47	47%
Between Rp 5M and Rp. 10M/month	49	49%
More than Rp. 10M/month	2	2%
Push-notification interactivity in the last two months		
More than 4 times/month	37	37%
Between 3-4 times/month	35	35%
Between 1-2 times/month	16	16%
2 times within 2 months	9	9%
1 time within 2 months	3	3%
Age		
Between 18-28 years	86	86%
Between 28-38 years	11	11%
>38 years old	3	3%
Total	100	100%

In line with the data collection process described by Walujo et al. (2023), an online survey was formulated using Google Forms and distributed among social media users who had received and engaged with push notifications from green industries (i.e., sustainable fashion, eco-friendly cosmetics, and organic foods). At the beginning of the online survey, respondents were presented with a screening question: "Have you received and interacted with push notifications from green industries such as sustainable fashion, eco-friendly cosmetics, and organic foods at least once in the past few weeks?" To avoid misconception, the definitions of sustainable fashion, eco-friendly cosmetics, and organic foods were described to participants at the beginning of the questionnaire. Respondents

who had never received and interacted with such push notifications were automatically disqualified. According to Herjanto et al. (2021b; 2023), a screening question serves as a tool to ensure the eligibility of respondents and to maintain the robustness of the data collected.

Data Analysis Procedure and Results

Following recommendations from Hair et al. (2019), this study analyzed collected and usable data using Smart PLS-SEM data analysis software. The PLS-SEM approach is widely used in consumer behavior (Herjanto et al., 2021b; Santos-Corrada et al., 2022; Purohit et al., 2021) and information technology studies (Abubakre et al., 2022; Ali et al., 2021; Rehman et al., 2020) and provides a vigorous way of estimating statistical models (Hair et al., 2019).

RESULTS

The Smart-PLS statistical findings indicated that the scales had substantial factor loadings (ranging from 0.78 – 0.91) and reliable composite reliabilities (ranging from 0.70 – 0.78). This value met the minimum acceptable value of factor loadings of 0.3 (Babic & Zaric, 2020) and the value of composite reliabilities of 0.7 (Wang et al., 2017). More details of these measurement results are presented in Table 2.

Table 2. Results of the Measurement Model

Variable	Indicator	Items	Loading	CA	AVE
<i>Attitude Towards Push Notification</i>	PN1	I can't wait to receive push notifications from e-commerce mobile apps.	0,882	0,946	0,745
	PN2	I love getting push notifications from e-commerce mobile apps.	0,873		
	PN3	I love getting push notifications that give me the information I need.	0,858		
	PN4	I love getting push notifications that provide up-to-date information.	0,859		
	PN5	I like getting push notifications as a reference for purchasing products.	0,905		
	PN6	I like getting push notifications telling me about products I like.	0,799		

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Variable	Indicator	Items	Loading	CA	AVE
<i>Emotional value</i>	EV1	I love getting push notifications.	0,889	0,935	0,783
	EV2	I enjoy receiving push notifications.	0,877		
	EV3	I feel comfortable getting push notifications.	0,866		
	EV4	I am entertained getting push notifications.	0,907		
<i>Personalization</i>	PER1	I find personalized notifications offer deals customized to my needs.	0,869	0,933	0,699
	PER2	I feel personalized notifications provide more relevant promotions tailored to personal interests.	0,867		
	PER3	I find personalized notifications to provide information about the products I want to purchase	0,809		
	PER4	I am satisfied with personalized notifications.	0,847		
	PER5	I feel like the personalized notifications are tailored to my preferences.	0,842		
	PER6	I feel like the personalized notifications are tailored to my profile	0,780		
<i>Behavioral response</i>	BR1	I immediately clicked after the push notifications were received.	0,889	0,927	0,760
	BR2	I clicked the push notifications after receiving many of them.	0,887		
	BR3	I click the push notifications when I have time.	0,863		
	BR4	I completely ignored the push notifications when I received them.	0,849		

In addition, the results also showed that all hypotheses reached a minimum t-value score of 1.96. According to Pribadi et al. (2019), this score suggested that the relationship was significant and acceptable. The results of the path-coefficient (β) and t-value for each relationship in question are presented in Table 3.

Table 3: Path Coefficient And T-Statistic

	Hypotheses	Path Coefficients	T Statistic*	Remark
H1	PN > EV	0,874	20,991	Supported
H2	EV > BR	0,872	26,889	Supported
H3a	PN x PER > EV	0,073	2,303	Supported
H3b	EV x PER > BR	0,060	2,138	Supported

Notes: Based on a significant level of 5% or t-value of 1.96

DISCUSSION

The findings showed that the attitude toward push notifications had a positive and significant impact on emotional value. That is, customers' attitudes toward push notifications were responsible for generating customer emotions. Generally, attitude is a product of customers' evaluation of stimuli (Herjanto et al., 2023). In this evaluation process, customers tended to screen and appraise stimuli based on their likes and dislikes (Filleri & McLeay, 2014). As described by Nurtjahjani and Puspita (2021), the degree of like or dislike is associated with customer preferences. When stimuli fulfill customer preferences, the stimuli tend to improve customers' likes and generate positive emotions. In contrast, when stimuli fail to satisfy customers' preferences, the stimuli are likely to create dislikes, which subsequently generate negative emotions. Given this explanation, it is therefore safe to suggest that the attitude toward push notifications serves as a true reflection of customers' perception of being valued and esteemed by businesses. Accordingly, the degree of such perceptions will develop different types of emotions (Kalsaker & Drakatos, 2009). Thus, this explanation shows that it is important for businesses to regularly maintain and improve customers' positive attitude toward their push notifications.

Next, our study discovered that emotional value affects behavioral response. Herjanto et al. (2021a) suggest that emotion is one of the most important components in determining customer behavior. According to the traditional emotion theory proposed by Permzadian and Zhao (2024), emotion determines behavior by influencing customer information processing, regulating responses to persuasive appeals and marketing stimuli, and instigating goal setting. For example, in the context of push notifications, customer emotions (positive or negative emotions) may serve

as an evaluation tool to measure the extent to which push notifications appeal to customers' preferences. As suggested by Vanderlind et al. (2022), when customers experience positive emotions, they tend to be more open and willing to engage with stimuli. Thus, in this situation, customers are generally more willing to interact with push notifications and evaluate their content more positively. In sum, these findings show that the more customers experience positive emotions, the more likely they are to behave positively, while in contrast, the more customers experience negative emotions, the less likelihood they are to behave positively.

Lastly, the present study found that personalization moderates the relationship between attitude toward push notifications and emotional value and between emotional value and behavioral response. This suggests that personalization plays an important role in determining the degree of customers' behavioral response to push notifications. The reason for these findings can be explained by Hutchmacher and Appel's (2023) concept of the psychology of personalization. According to these authors, personalization in the digital world can lead to desirable outcomes by reducing information overload. Being free from unnecessary information allows customers to focus on relevant and interesting information, and subsequently increases customers' sense of well-being. Thus, when the content of push notifications is highly personalized, this positive condition improves customers' experience and attitude toward push notifications which in turn affects their behavioral response. To some extent, these findings validate Kozyreva et al.'s (2021) study which also found that personalization affects individuals' attitudes. Similarly, Abu Sanab and Anagreh (2015) found that personalization allows businesses to develop one-to-one relationships which further helps businesses to offer error-free and relevant information. When customers repeatedly receive accurate and relevant information, they are more likely to experience positive emotions such as satisfaction (Song et al., 2017), which further leads to specific behavioral responses.

CONCLUSION

Our study offers two unique contributions to the push-notification study reservoir. First, unlike existing studies, our model conceptualizes emotional value as an outcome of attitude toward push notifications. Second, the study also found that personalization plays an important role in facilitating the relationship between attitude toward push notifications and emotional value and between emotional value and behavioral response. These findings underline the need for businesses to maintain the quality of

their push notifications by offering personalized information that suits their customers' preferences and increases their positive attitude toward such notifications.

Although this study was conducted carefully and robustly, it has several limitations. First, the study collected data solely from residents in the Surabaya area of Indonesia. Because of this, caution should be taken in generalizing our findings. Second, this study was carried out in three green industry contexts (i.e., sustainable fashion, eco-friendly cosmetics, and organic foods); therefore, the findings may only apply to such industries and are not reflective of other industries. Future researchers could extend this investigation to include other sustainable products and behaviors such as ridesharing. Finally, our model may be oversimplified in its utilization of only four different constructs (i.e., attitude toward push notifications, emotional value, behavioral response, and personalization). Future research could specifically investigate the effect of positive and negative emotions on click-through or swipe-away push notification behavior. Finally, while our samples answered the screening question accurately, including images of constructs in future questions is highly recommended to avoid confusion that could affect the quality and robustness of the study findings.

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