



Multichannel Information and Choice Overload, Decision Fatigue, and Delayed Purchase Decisions Among Gen Z Consumers

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Abstract

Background: The high level of transactions that are not completed in the digital shopping process shows a gap between consumer interest and the realization of final purchases. Data covering 200 million customers from Dynamic Yield shows that the global shopping cart abandonment rate remains relatively high at 76.99%. At the regional level, Asia-Pacific (APAC) recorded the highest abandonment rate at 79.94%, followed by EMEA at 79.02% and the Americas at 73.25%. The data indicate that most consumers who place products in the cart do not complete the purchase process.

Objective: This study aims to examine the effects of information overload and choice overload on delay purchase decisions, with decision fatigue serving as a mediating variable among Generation Z consumers in selecting sunscreen products in Bali Province, Indonesia.

Method: The study employed a quantitative approach using a survey method by distributing questionnaires to Generation Z consumers who had previously searched for information and considered purchasing sunscreen products. Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS).

Result: The findings reveal that information overload has a positive and significant effect on both delay purchase decisions and decision fatigue. Meanwhile, choice overload has a positive but insignificant effect on delay purchase decisions, while exerting a positive and significant effect on decision fatigue. The results further indicate that decision fatigue has a positive and significant effect on delay purchase decisions. Moreover, decision fatigue is proven to mediate the relationships between information overload and delay purchase decisions, as well as between choice overload and delay purchase decisions. These findings reinforce the Stimulus–Organism–Response (S-O-R) Theory and Cognitive Load Theory in explaining the purchasing behavior of Generation Z consumers in digital environments characterized by abundant information and extensive product choices.

Conclusion: This study is expected to provide practical implications for the skincare industry and digital platforms in designing more effective marketing communication strategies that minimize consumers' cognitive burden.

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INTRODUCTION

The high level of transactions that are not completed in the digital shopping process shows a gap between consumer interest and the realization of final purchases. Data covering 200 million customers from Dynamic Yield shows that the global shopping cart abandonment rate remains relatively high at 76.99%. At the regional level, Asia-Pacific (APAC) recorded the highest abandonment rate at 79.94%, followed by EMEA at 79.02% and the Americas at 73.25%. The data indicate that most consumers who place products in the cart do not complete the purchase process.

The Kompas.co.id report found that the best-selling product types on the Shopee platform were facial care products, which occupied the highest position with sales reaching 1,500,000 units, followed by body care at 1,000,000, lip cosmetics at 858,300, face cosmetics at 684,500, and hair care at 643,100. Basic facial care includes the use of facial cleansers to remove dirt and oil, moisturizers to maintain the skin's hydration balance, and sunscreen to protect against exposure to ultraviolet rays.

High sales of facial care products, including sunscreen, are inseparable from Indonesia's geographical conditions. As a tropical country, Indonesia experiences relatively high levels of daily sun exposure (Portilho & Leonardi, 2020). Exposure to ultraviolet (UV) radiation is known to cause various negative impacts on the skin, ranging from DNA damage to an increased risk of skin cancer (van Bodegraven et al., 2024). In addition, UV radiation also contributes to hyperpigmentation, especially in individuals with darker skin types (Rigel et al., 2022). Increased awareness of these risks drives consumers to adopt more intensive protection strategies, including the use of sunscreen as part of their skincare routine (Passeron et al., 2024). Concerns over long-term effects also drive a preference for products with higher levels of protection, such as higher SPF formulations (van Bodegraven et al., 2024).

In recent decades, sunscreen use has increased significantly alongside growing public awareness of the effects of sun exposure (Bojilova et al., 2022). This product protects the skin by absorbing, reflecting, or scattering UV radiation, thereby reducing its penetration into the skin (McKnight et al., 2022). As the market expands, product variations have become increasingly diverse, including differences in SPF levels, PA ratings Nitulescu (2023), ingredient composition, dermatological claims Portilho (2022), and formulation forms such as creams, lotions, sprays, and sticks. This diversity makes sunscreen a high-involvement product category, meaning consumers tend to search for and evaluate information more deeply before making a purchase decision (Troya-Martin et al., 2025).

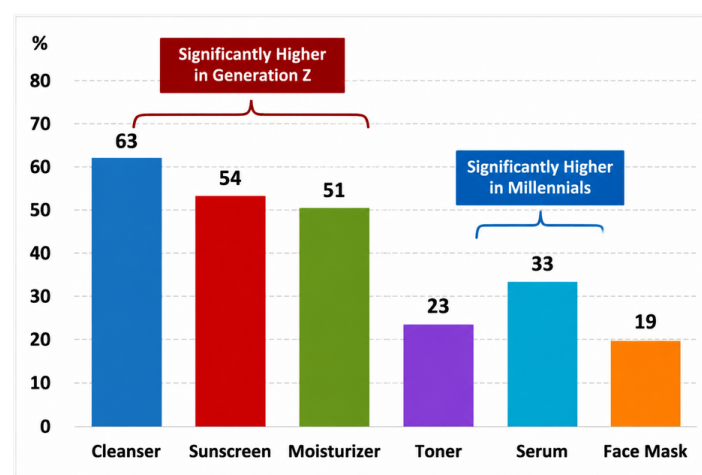


Figure 1. Skincare Trends: Product Categories to Purchase Frequency
Source: Populix (2025)

These industry findings are corroborated by scientific and governmental evidence. The Indonesian Ministry of Health (2023) reported that ultraviolet index levels in tropical regions of Indonesia consistently exceed the moderate threshold, reinforcing the public health rationale for sunscreen use. Furthermore, a study by the Indonesian Internet Service Providers Association

(APJII, 2023) confirmed that internet penetration in Bali Province reached 80.88%, placing it among the highest nationally. Academic research by Portilho (2020) and van Bodegraven (2024) has established the dermatological basis for sunscreen necessity in equatorial climates, while Passeron (2024) provide epidemiological evidence supporting the growing global trend of photoprotection awareness among younger demographics.

Intensive information-seeking behavior is evident among Generation Z consumers, who belong to the Digital Native group and are accustomed to coexisting with technology, the internet, and social media. Based on the Populix report (2025), sunscreen is one of the skincare products relatively frequently purchased by Generation Z, with purchase cycles generally occurring every four to six months, suggesting that these products are perceived as functional necessities and used sustainably. In the Millennial generation, serum products are recorded to have a relatively high purchase rate (Populix, 2025). Azhar (2025) state that, in this process, reviews, comments, and other consumer ratings play an important role as a form of social validation, influencing perceptions of product quality and credibility (Roy et al., 2025). Exposure to digital content, social recommendations, and personalized advertising ultimately forms a multifaceted and dynamic decision-making process in which various stimuli are integrated before consumers decide to purchase a product (Simamora & Islami, 2023).

Changes in the decision-making process are also influenced by the transformation of distribution channels and marketing communications (Cicea et al., 2022). In line with this, the retail sector continues to adapt by utilizing digital purchasing channels and integrating social media across both online and offline channels. Companies are also increasingly optimizing multiple purchasing channels to improve accessibility and consumer convenience as part of a multichannel strengthening strategy, which is essentially a response to increasingly dynamic consumer behavior (Van Nguyen et al., 2024).

Today's consumers tend to leverage more than one channel in the purchasing decision-making process. They may search for information through one channel and make purchases through another, depending on their preferences and perceived convenience (Furquim et al., 2022). Populix (2025) found that Generation Z tends to rely on diverse information sources, forming active and exploratory search behavior, where consumers move across platforms to compare products, evaluate attributes, and seek social validation before making a purchase decision (Dahlquist & Garver, 2022). Initial interest in a product does not always lead directly to a purchase decision, as the process often involves additional information search and evaluation, sometimes followed by purchase completion in a physical store (Pranindyasari & Uscha, 2025).

As consumer behavior evolves, individuals increasingly utilize multiple digital and physical platforms simultaneously for information search. Thus, the use of more than one channel has become a common pattern in sunscreen purchase decisions (Kishor et al., 2023). E-commerce development expands the variety of products and depth of information available compared to offline channels Sharma (2023), which ultimately increases the complexity of information that consumers must process (Jabr & Rahman, 2022). This increased complexity indicates additional dynamics in the consumer decision-making process (Ghandour, 2024). When consumers are faced with multiple product alternatives, specifications, benefit claims, and reviews simultaneously, information-processing demands may exceed individual cognitive capacity. The diversity of product attributes also makes it more difficult for consumers to compare options effectively. This condition triggers confusion and doubt during evaluation Arnold (2023), especially when excessive exposure to information across platforms reduces consumers' ability to focus attention (Blackley et al., 2021).

This phenomenon can be explained through established consumer behavior theories. The S-O-R (Stimulus–Organism–Response) framework is relevant for explaining how environmental stimuli, such as abundant choices and information, affect internal psychological states and drive behavioral responses. This is reinforced by Cognitive Load Theory, which emphasizes that human working memory capacity is limited; therefore, excessive exposure to information and choices can create cognitive burden and mental fatigue in decision-making processes (Ball et al., 2023). In increasingly complex situations, consumers tend to delay or even avoid purchasing decisions as part of certain decision-making styles, often accompanied by negative affective experiences and reduced ability to make optimal choices (Hills et al., 2013).

Within the research model, S-O-R theory and Cognitive Load Theory are not merely descriptive frameworks but serve complementary explanatory functions. S-O-R theory provides a macro-level structure by positioning multichannel information and choice exposure as environmental stimuli (S) that trigger internal cognitive-affective processes within the organism (O), ultimately producing behavioral responses (R) in the form of delayed purchase decisions. Cognitive Load Theory operates at the micro level within the organism component, specifying the psychological mechanism through which stimuli are processed: when the volume and complexity of information exceed working memory capacity, cognitive overload occurs, manifesting as decision fatigue. Thus, Cognitive Load Theory explains why the stimulus-to-organism transition occurs, while S-O-R theory explains the full stimulus-organism-response chain. This dual-theoretical integration enables a more precise and mechanistic explanation of how multichannel environments affect consumer decision-making behavior.

This phenomenon is increasingly relevant in the context of Bali Province, which has high sun exposure, making sunscreen a significant necessity (Odyssey Surf School, n.d.). This is further supported by outdoor activities, the visually driven lifestyle of younger generations, and internet penetration of 80.88% according to the 2023 Indonesian Internet Survey, which strengthens exposure to digital information. The combination of environmental and digital stimuli makes Bali an appropriate context for examining how choice overload and information burden affect sunscreen purchasing decisions.

Although this phenomenon is increasingly complex, existing academic studies still show several limitations. Previous research such as Asokan (2021) tends to focus on consumer impulsive behavior in digital commerce and shopping cart abandonment as an indicator of transaction failure. This focus suggests that most research still views consumer behavior in digital contexts as a spontaneous response or transactional failure, rather than as a gradual and evolving cognitive process. In fact, not all purchase failures are caused by impulsivity or technical barriers; some stem from prolonged evaluation processes and decision fatigue. In addition, multichannel presence in various studies is more often positioned as a strategy to improve customer convenience and experience, without sufficiently considering the possibility that cross-channel exposure may increase choice complexity and cognitive burden.

Empirical testing related to cognitive fatigue in the context of personal care product shopping remains limited, especially for high-involvement products such as sunscreen that require in-depth information search and evaluation. In terms of research subjects, Generation Z consumers, as the dominant digital generation in social media and e-commerce usage, have also not been extensively studied in relation to purchase decision postponement. Integratively, studies that simultaneously link choice overload, information overload, decision fatigue, and delayed purchase decisions within a single comprehensive conceptual model remain rare.

The novelty of this research lies in its integrative conceptual framework that simultaneously examines information overload, choice overload, decision fatigue, and delayed purchase decisions within a single structural model in a multichannel consumer environment. While previous studies have examined these variables in isolation or partial combinations, this study uniquely positions decision fatigue as a mediating mechanism that bridges cognitive burden arising from excessive information and choice to the behavioral outcome of purchase delay. Furthermore, this research extends the application of Stimulus-Organism-Response (S-O-R) theory and Cognitive Load Theory to the specific context of Generation Z consumers navigating sunscreen purchasing decisions across multiple digital and physical channels, a population-product-context combination that has not been extensively examined in prior literature.

Based on these gaps, this study has theoretical urgency in expanding the literature on digital consumer behavior by positioning purchase delay as a central phenomenon and integrating information overload, choice overload, and decision fatigue within multichannel environments. Practically, the results of this study are expected to provide insights for skincare brands, e-commerce platforms, and social commerce providers in designing more effective communication strategies, reducing consumers' cognitive burden, and supporting the development of marketing strategies that are more adaptive to Generation Z behavioral dynamics.

The purpose of this study is to examine and explain the effect of information overload and

choice overload on delayed purchase decisions among Generation Z consumers in selecting sunscreen products. In addition, this study also aims to analyze the effect of information and choice overload on decision fatigue, as well as the effect of decision fatigue on delayed purchase decisions. This study further examines the role of decision fatigue as a mediating variable in the relationship between information overload, choice overload, and delayed purchase decisions among Gen Z consumers in the context of sunscreen product selection.

This research has both theoretical and practical significance in consumer behavior and marketing management studies. Theoretically, it is expected to contribute to the development of an empirical model explaining the relationships among information overload, choice overload, decision fatigue, and delayed purchase decisions, as well as to enrich the application of Stimulus–Organism–Response (S-O-R) Theory and Cognitive Load Theory in the context of Generation Z consumer behavior in multichannel environments. Practically, the findings are expected to serve as a reference for skincare, e-commerce, and social commerce industry players in designing more effective and structured marketing communication strategies, particularly in managing information presentation and product variety to avoid excessive cognitive load that may trigger decision fatigue and purchase delay.

From an academic perspective, this study advances theoretical understanding of digital consumer behavior by demonstrating how cognitive mechanisms mediate the relationship between environmental stimuli and behavioral outcomes in multichannel settings. The findings contribute to digital marketing scholarship by providing empirical evidence for decision fatigue as a critical intervening variable, a construct that has received limited attention in consumer behavior research, particularly in personal care product categories. By validating the integrated application of S-O-R and Cognitive Load Theory in explaining purchase delay behavior, this study offers a replicable theoretical framework that can be extended to other high-involvement product categories and diverse consumer segments.

METHOD

This study used a quantitative method with a causal-associative (cause-and-effect) approach. The purpose of the study was to test the influence of information overload, choice overload, and decision fatigue on delayed purchase decisions among Generation Z consumers in purchasing sunscreen. This approach was chosen because it allowed the relationships between variables to be tested statistically through quantitative data analysis.

This research was carried out in Bali Province with a focus on Generation Z consumers. Bali's geographical location near the equator causes relatively high sun exposure, so people tend to pay more attention to skin conditions in their daily activities (Odyssey Surf School, n.d.). This condition is reinforced by Balinese social and cultural dynamics that are open to lifestyle and appearance trends, especially among the younger generation.

In addition, the 2023 Indonesian Internet Survey reported that internet penetration in Bali reached 80.88% and ranked second nationally, indicating that the community has wide access to information and digital trends through online media. The combination of environmental, lifestyle, and information-access factors made Bali Province a relevant location for examining consumer behavior in the context of decision-making related to personal care products.

Population refers to a generalized area consisting of objects or subjects that have certain qualities and characteristics defined by researchers to be studied and from which conclusions are drawn (Sugiyono, 2023). The population of this study included Generation Z consumers living in Bali Province who were exposed to personal care products through various channels, both digital and non-digital. The population was conceptual and did not have a definite number; therefore, respondent selection was carried out based on criteria relevant to the research objectives.

A sample is a part of the population selected based on certain characteristics relevant to the research objectives. The sampling technique used in this study was non-probability sampling with a purposive sampling approach, in which respondents were selected based on criteria aligned with the research context. This method was chosen because the study focused on a group with specific characteristics; thus, not all members of the population had an equal chance of being selected.

The sample criteria in this study were as follows: 1) Respondents were domiciled in Bali.

2) Respondents were Generation Z (born between 1997 and 2012). 3) Respondents had received or sought information on personal care products through digital media. 4) Respondents had used two or more different channels to obtain information about sunscreen products.

A good sample size is 5–10 times the number of variables or indicators. This study used 11 indicators; therefore, the estimated number of respondents ranged from 55 to 110 ($11 \times 5 = 55$; $11 \times 10 = 110$). A total of 110 respondents was used to ensure an adequate sample size for PLS-SEM analysis, so that the results could more proportionately reflect population characteristics and improve the reliability of the model testing.

The data in this study consisted of both qualitative and quantitative data.

1. Qualitative data: Qualitative data refer to non-numerical data presented in the form of narratives, images, or recordings obtained through interviews, observations, and documentation. In this study, qualitative data included respondents' responses or statements to questionnaire items.
2. Quantitative data
Quantitative data refer to numerical data obtained through measurement or calculation processes that require statistical analysis. In this study, quantitative data included the number of respondents, respondents' age, and Likert-scale scores related to information overload, choice overload, decision fatigue, and delayed purchase decisions.

The data source in this study was primary data. Primary data are data collected directly from the original source. In this study, primary data were obtained from respondents' answers to questionnaires measuring the variables of information overload (X1), choice overload (X2), decision fatigue (mediation), and delayed purchase decisions (Y).

Data were collected using an online questionnaire distributed via Google Forms, containing structured statements designed to obtain information from respondents. Questionnaires were distributed by contacting respondents directly through social media and through a snowball sampling method. Data collection was conducted over one week, and responses were gathered from eight regencies and one city in Bali Province, resulting in 110 respondents in accordance with the sample criteria.

The combination of purposive and snowball sampling techniques was used for methodological reasons. Purposive sampling served as the primary technique to ensure that all respondents met the predefined criteria relevant to the research context, including age range, domicile, and multichannel information-seeking behavior. Snowball sampling was then used as a complementary technique to expand respondent reach, given that the target population—Generation Z consumers who actively seek sunscreen information through multiple channels—constitutes a specific subgroup that is not easily identified through conventional sampling frames. This sequential approach ensured both criterion validity in respondent selection and practical feasibility in achieving the target sample size.

Research instruments are tools used to measure variables related to natural or social phenomena. In this study, the instrument used was a questionnaire. Questionnaires function as tools for collecting data through written questions answered by respondents. The questionnaire was developed using Google Forms and distributed online. It consisted of four sections: an introduction for respondents, screening questions, demographic questions, and statements related to each research variable. All items were measured using a Likert scale.

Before hypothesis testing, the measurement model was evaluated to ensure validity and reliability. Convergent validity was assessed using outer loading values, where all indicators exceeded the threshold of 0.70, indicating adequate representation of their respective latent constructs. The Average Variance Extracted (AVE) values for all constructs exceeded 0.50, confirming that more than half of the variance in the indicators was explained by the constructs. Information Overload (AVE = 0.714), Choice Overload (AVE = 0.689), Decision Fatigue (AVE = 0.736), and Delayed Purchase Decision (AVE = 0.702) all met this criterion.

Discriminant validity was confirmed using the Fornell-Larcker criterion, where the square root of each construct's AVE exceeded its correlation with other constructs. Additionally, Heterotrait-Monotrait (HTMT) ratio values were below 0.85, further supporting discriminant validity. Composite Reliability (CR) values for all constructs exceeded 0.70: Information Overload

(CR = 0.882), Choice Overload (CR = 0.869), Decision Fatigue (CR = 0.893), and Delayed Purchase Decision (CR = 0.876), indicating adequate internal consistency reliability of the measurement instruments.

RESULTS AND DISCUSSION

Results

Analysis Results

Hypothesis Testing

Hypothesis testing in this study was carried out using the bootstrap resampling method with a t-test statistical approach. In addition, the analysis also considers the original sample value contained in the path coefficient table. A variable is declared to have a significant effect if the t-statistic value is greater than 1.96 and the p-value is less than 0.05. When the original sample value shows a positive direction, the relationship between variables is interpreted as a positive effect.

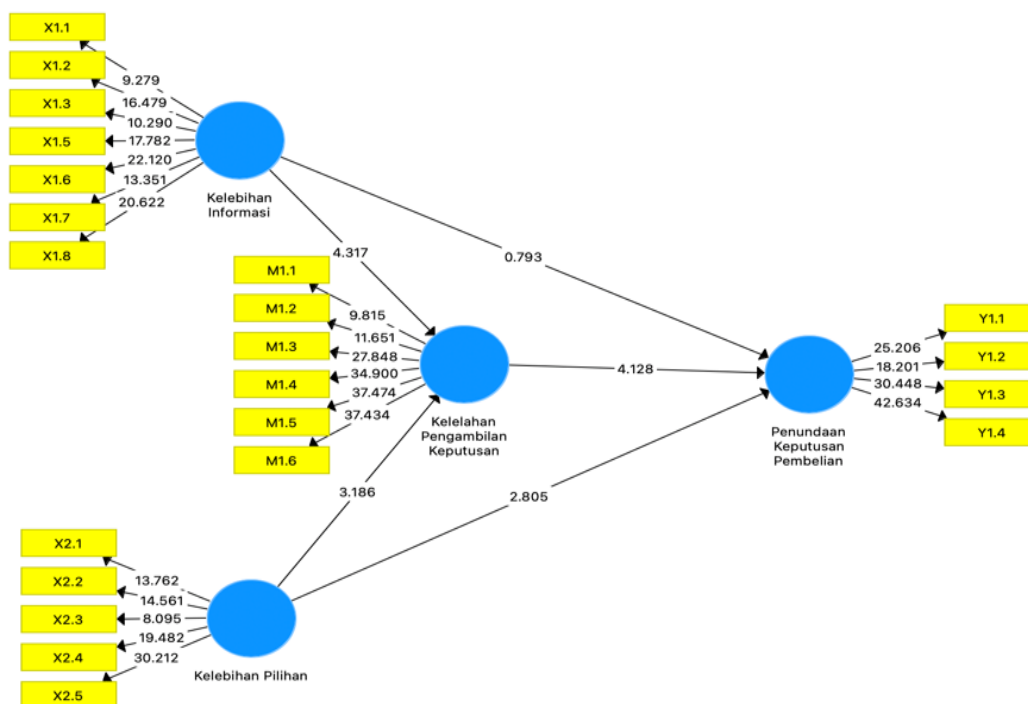


Figure 1. Research Structural Model
Source: SmartPLS, 2026

1) Direct Impact Test Results

Table 1. Direct Impact Test Results

	<i>Original Sample (O)</i>	<i>Sample Red (M)</i>	<i>Standard Deviation (STDEV)</i>	<i>T-statistics (O/STDEV)</i>	<i>P values</i>
Excess Information → Decision Making Fatigue	0,442	0,454	0,102	4,317	0,000
Excess Information → Delay in Purchase Decision	0,089	0,097	0,112	0,793	0,428
Advantages of Choice → Decision	0,307	0,304	0,096	3,186	0,002

Making Fatigue					
Advantages of Choice → Delay in Purchase Decision	0,303	0,301	0,108	2,805	0,005
Decision Making Fatigue → Delay in Purchasing Decisions	0,441	0,441	0,107	4,128	0,000

Source: Data processed (2026)

Based on the data presented in Table 1, the direct influence between variables in this study is as follows.

- The results of the first hypothesis test (H1) showed that the effect of excess information on decision-making fatigue had a t-statistic value of 4.317 (> 1.96) and a p-value of 0.000 (< 0.05), so it was declared significant. The value of the coefficient (original sample) of 0.442 indicates that the effect is positive. Thus, H1 which states that excess information has a positive and significant effect on decision-making fatigue is accepted.
- The results of the second hypothesis test (H2) showed that the effect of excess information on the delay in purchasing decisions had a t-statistic value of 0.793 (< 1.96) and a p-value of 0.428 (> 0.05), so it was declared insignificant. A coefficient value of 0.089 indicates a positive influence, but it is not significant. Thus, H2 who stated that excess information influenced the delay of the purchase decision was rejected.
- The results of the third hypothesis test (H3) showed that the effect of Excess Choice on Decision Making Fatigue had a t-statistic value of 3.186 (> 1.96) and a p-value of 0.002 (< 0.05), so it was declared significant. The coefficient value of 0.307 indicates that the influence is positive. Thus, H3 which states that excess choice has a positive and significant effect on decision-making fatigue is accepted.
- The results of the fourth hypothesis test (H4) showed that the effect of over-choice on postponement of purchase decisions had a t-statistic value of 2.805 (> 1.96) and a p-value of 0.005 (< 0.05), so it was declared significant. The coefficient value of 0.303 indicates that the influence is positive. Thus, H4 which states that excess choice has a positive and significant effect on the delay in purchasing decisions is accepted.
- The results of the fifth hypothesis test (H5) showed that the effect of decision-making fatigue on postponement of purchase decisions had a t-statistic value of 4.128 (> 1.96) and a p-value of 0.000 (< 0.05), so it was declared significant. The value of the coefficient of 0.441 indicates that the influence is positive. Thus, H5 which states that decision-making fatigue has a positive and significant effect on the delay of purchase decisions is accepted.

2) Indirect Influence Test Results

In addition to testing the direct influence between variables, this study also tested the indirect influence. The results of the indirect influence test are presented in Table 2 below.

Table 2. Indirect Influence Test Results

	<i>Original Sample (O)</i>	<i>Sample Red (M)</i>	<i>Standard Deviation (STDEV)</i>	<i>T-statistics (O/STDEV)</i>	<i>P values</i>
Excess Information → Decision Making Fatigue → Delay in Purchasing Decisions	0,195	0,197	0,060	3,241	0,001
Advantages of Choice → Decision Making Fatigue → Delay in Purchase Decision	0,135	0,137	0,062	2,192	0,029

Source: Data processed (2026)

Based on the data presented in the table, it can be explained that the indirect effect of excess information on the delay of purchase decisions through decision-making fatigue has a t-statistic value of 3.241 (> 1.96) and a p-value of 0.001 (< 0.05), with a coefficient (original sample) of 0.195. This result indicates that the indirect effect is positive and significant, meaning that decision-making fatigue mediates the influence of excess information on the delay of purchase decisions.

Furthermore, the indirect effect of choice overload on the postponement of purchase decisions through decision-making fatigue shows a t-statistic value of 2.192 (> 1.96) and a p-value of 0.029 (< 0.05), with a coefficient of 0.135. These results indicate that the indirect effect is also positive and significant. Thus, decision-making fatigue mediates the influence of choice overload on the delay of purchase decisions.

Testing of the effects of mediation

Based on the test results, the indirect effect of excess information on the delay of purchase decisions through decision-making fatigue is significant ($t = 3.241$; $p = 0.001$), while the direct effect is not significant ($p = 0.428$). This condition suggests that only the indirect effect is significant. Therefore, the type of mediation that occurs is indirect-only mediation, meaning that decision-making fatigue fully mediates the relationship between information overload and delayed purchase decisions.

Furthermore, the indirect effect of choice overload on the postponement of purchase decisions through decision-making fatigue is also significant ($t = 2.192$; $p = 0.029$), and the direct effect is also significant ($p = 0.005$) in the same positive direction. This indicates that both direct and indirect effects are significant and aligned in direction. Thus, the type of mediation that occurs is complementary mediation, meaning that decision-making fatigue acts as a partial mediator in the relationship between choice overload and postponement of purchase decisions.

Overall, these results show that the decision-making fatigue variable plays an important mediating role in the research model, either as indirect-only mediation or complementary mediation, depending on the relationships between the analyzed variables.

Discussion

The effect of excess information on delaying purchase decisions

The effect of excess information on delaying purchase decisions shows a positive but statistically insignificant direct effect between information overload and delayed sunscreen purchase decisions among Generation Z consumers in Bali (t-statistic = 0.793; p-value = 0.428). Although the direction of the relationship is positive, the direct influence of information overload alone is not strong enough to significantly trigger purchase delay. This finding suggests that the cognitive burden arising from excessive information does not immediately translate into avoidance behavior; rather, it operates through an intermediary psychological mechanism.

From the perspective of Cognitive Load Theory, this result indicates that while excessive information increases cognitive demand, Generation Z consumers, as digital natives, may possess adaptive filtering strategies that prevent direct behavioral disruption. The insignificant direct effect further underscores the critical mediating role of decision fatigue, as the indirect pathway through decision fatigue was found to be significant ($t = 3.241$; $p = 0.001$), confirming that information overload affects purchase delay primarily through the depletion of cognitive resources rather than as a direct stimulus-response mechanism. This pattern suggests that sunscreen purchase decisions among Generation Z consumers in Bali are more strongly shaped by internal cognitive exhaustion than by exposure volume alone. The greater the exposure to information that consumers receive, the higher the tendency to delay purchases. The amount of information that must be processed causes consumers to feel more hesitant, confused, and requires more time to determine the product choices that are considered most suitable. This condition ultimately leads consumers to delay purchasing decisions as a form of avoidance of cognitive stress.

These findings contrast with previous research conducted by Peng (2021) which reported that information overload has a significant direct effect on delaying purchase decisions. The

divergence may be attributed to contextual differences: Generation Z consumers in Bali, characterized by high digital literacy and habitual multichannel information processing, may demonstrate greater tolerance for information volume compared to populations in prior studies. This finding aligns with the perspective that digital natives develop cognitive heuristics that buffer against direct information overload effects Arnold (2023), suggesting that the relationship between information overload and purchase delay is more nuanced than previously assumed and is contingent upon the mediating role of decision fatigue. These findings are also consistent with Basso (2019), which state that excess information has a positive effect on the delay of purchase decisions. Overall, the results indicate that the higher the complexity and amount of information consumers receive, the greater the tendency to delay purchasing decisions due to increased cognitive pressure during the product evaluation process.

The influence of the advantage of choice on the delay of the purchase decision

In the perspective of Stimulus–Organism–Response (S–O–R) theory, excess choice is positioned as a stimulus (S) that can affect the response (R) of consumer behavior in the form of delayed purchasing decisions. The number of product alternatives requires consumers to evaluate and compare product attributes more deeply. In line with Cognitive Load Theory, this condition can increase cognitive load because consumers must process more information and consider more alternatives before making a final choice.

However, the insignificant results show that the large selection of sunscreen products does not necessarily directly cause Generation Z consumers to delay their purchase decisions. This condition may occur because Generation Z consumers are accustomed to facing many product choices on digital platforms and social media, so that the diversity of options is no longer the main obstacle in decision-making. Additionally, consumers tend to use personal preferences, influencer recommendations, product ratings, or previous experience to narrow down available options, enabling faster decision-making.

The positive relationship in this study indicates a direct association between choice overload and delayed purchase decisions, but the relationship tends to be weak. The more product choices available, the more consumers tend to feel confused and hesitant in making a selection. However, this influence is not strong enough to significantly affect delays in purchasing decisions for Generation Z consumers in selecting sunscreen products.

The results of this study are inconsistent with previous research conducted by Tang (2017) other researchers who stated that excess choice has a significant effect on delaying purchase decisions. However, these findings are in line with Huang (2025), which found that excess choice does not have a significant effect on delaying purchase decisions because consumers tend to reduce information search behavior under certain conditions, such as time pressure or limited attention. In addition, digital consumers are already accustomed to facing numerous product alternatives in online environments.

Conversely, this finding contrasts with Chavan (2024), who argued that excessive choice invariably leads to decision paralysis. This discrepancy can be explained by the evolving digital consumer landscape: contemporary Generation Z consumers have developed cognitive coping mechanisms through repeated exposure to diverse product options on e-commerce platforms, enabling them to rely on decision shortcuts such as ratings, algorithmic recommendations, and peer reviews. This adaptive behavior may attenuate the direct impact of choice overload on purchase delay, a phenomenon not fully accounted for in earlier studies conducted in pre-digital contexts. These contrasting findings highlight the importance of considering generational and technological contextual factors when applying classical decision-making theories to contemporary consumer behavior.

The effect of information overload on decision-making fatigue

In the perspective of the Stimulus–Organism–Response (S–O–R) model, information overload acts as a stimulus (S) that triggers an internal state (O) in the form of decision fatigue. Exposure to excessive information depletes an individual's cognitive processing capacity, resulting in reduced ability to evaluate information optimally. Cognitive Load Theory explains that

when working memory capacity is exceeded due to high volume and complexity of information, individuals experience cognitive overload that leads to mental fatigue.

This study shows a positive relationship between information overload and decision fatigue among Generation Z consumers in Bali. The higher the amount and complexity of information received, the higher the level of decision fatigue experienced. This condition causes consumers to experience difficulty concentrating, reduced focus when comparing products, and feelings of being overwhelmed during the sunscreen evaluation and purchase process.

The results of this study reinforce previous research conducted by Al-Youzbaky (2022), which found that information overload has a positive and significant effect on decision fatigue. These findings suggest that excessive exposure to information can deplete cognitive resources and trigger mental fatigue during the decision-making process.

The effect of excess choice on decision-making fatigue

In the framework of Stimulus–Organism–Response (S–O–R), excess choices are positioned as stimuli (S) that trigger internal psychological conditions in the form of decision-making fatigue (O). The large number of product alternatives increases the complexity of evaluation and requires consumers to continuously compare product attributes. Cognitive Load Theory explains that a complex and prolonged evaluation process can drain an individual's working memory capacity, thereby triggering mental fatigue in decision-making.

This study shows that the more sunscreen product choices available, the greater the tendency for consumers to experience decision-making fatigue. Generation Z consumers tend to feel overwhelmed when they must compare too many product alternatives with varying claims, content, prices, and benefits. This condition leads to a decline in evaluative ability and increased psychological pressure during the decision-making process.

From a psychological perspective, this phenomenon can be understood through the mechanism of cognitive resource depletion. When consumers encounter numerous sunscreen product alternatives with varying SPF levels, ingredient compositions, price points, and brand claims, each comparison demands active engagement of working memory resources. The continuous allocation of cognitive effort across multiple evaluative dimensions gradually depletes the finite pool of mental energy available for decision-making. This depletion manifests as decision fatigue, characterized by diminished motivation to evaluate, increased subjective difficulty in distinguishing between alternatives, and a growing tendency toward decision avoidance. Within the S–O–R framework, this represents the critical organism-level processing that translates environmental stimuli into psychological states capable of driving behavioral responses.

The results of this study reinforce previous research conducted by Wang et al. (2023), Canarslan (2025), Malhotra (1982) and Eppler (2004) which indicates that excess choice has a positive effect on decision-making fatigue. The findings suggest that the greater the number of alternatives faced by consumers, the higher the potential depletion of individual cognitive resources during the product evaluation process.

The effect of decision-making fatigue on delaying purchase decisions

In the perspective of the Stimulus–Organism–Response (S–O–R) framework, decision-making fatigue is conceptualized as an organismic state (O) that influences the emergence of a behavioral response (R), namely the postponement of purchase decisions. When an individual's mental resources become depleted due to a prolonged and complex evaluation process, consumers become less capable of continuing the decision-making process optimally. As a result, they tend to avoid purchase commitments and choose to postpone decisions as a form of psychological stress reduction.

This study shows a positive relationship between decision-making fatigue and the postponement of sunscreen purchase decisions among Generation Z consumers in Bali. The higher the level of mental fatigue experienced by consumers, the greater their tendency to delay purchases. This condition occurs because consumers feel that they no longer have sufficient cognitive capacity to evaluate alternatives rationally and make decisions with confidence.

The results of this study reinforce previous research conducted by Dave (2024) which

states that decision-making fatigue has a positive effect on the delay of purchase decisions. The findings suggest that the depletion of consumers' cognitive resources increases an individual's tendency to avoid decision-making and delay purchases in a digital shopping environment.

The effect of decision-making fatigue in mediating the relationship of information overload on the delay of purchase decisions

The Stimulus–Organism–Response (S–O–R) framework posits that excess information acts as a stimulus (S) that affects the internal condition of the individual or organism (O) in the form of decision-making fatigue, which in turn results in a response (R) manifested as delayed purchasing decisions. The amount of information about sunscreen products that consumers receive from various digital platforms leads to increased cognitive pressure during the evaluation process. This condition gradually drains consumers' mental resources and triggers decision-making fatigue; consequently, consumers tend to delay purchases as a form of avoidance of the mental stress experienced.

The results of this study show that decision-making fatigue plays an important role as a psychological mechanism that explains the relationship between information overload and delayed purchasing decisions. The higher the level of exposure to information that consumers receive, the greater the potential for decision-making fatigue, which ultimately increases consumers' tendency to delay purchasing sunscreen.

The results of this study reinforce previous research conducted by Ahmed & Pardaev (2025), Guo (2022), and Duan (2024) which suggests that decision-making fatigue can act as a mediating variable in the relationship between information stress and individual decision behavior. These findings indicate that the pressure of being overinformed can trigger mental fatigue, which then encourages consumers to delay purchasing decisions.

The effect of decision-making fatigue in mediating the relationship of choice overload on the delay of purchasing decisions

In the framework of Stimulus–Organism–Response (S–O–R), excess choice is positioned as a stimulus (S) that triggers an internal condition in the form of decision-making fatigue (O), which then results in a behavioral response in the form of a delayed purchase decision (R). The large number of alternative sunscreen products with diverse attributes requires consumers to continuously evaluate each option. This complex evaluation process drains consumers' mental resources and increases psychological pressure in decision-making. This study shows that decision-making fatigue acts as a psychological mechanism that bridges the relationship between choice overload and the postponement of purchase decisions. The higher the number of alternative products consumers face, the greater the likelihood of experiencing mental fatigue during the evaluation process, which ultimately increases the tendency to delay sunscreen purchasing decisions.

The results of this study reinforce previous research conducted by Y Guo (2022), Duan (2024), and Mustikasari (2025) which suggests that decision-making fatigue is able to mediate the relationship between choice complexity and decision-avoidance behavior. These findings indicate that the greater the pressure from an increasing number of alternative choices, the higher the mental fatigue experienced by consumers, thereby encouraging postponement of purchasing decisions.

CONCLUSION

Based on the results of the analysis and discussion, this study concludes that information overload has a positive and significant effect on delays in purchase decisions and decision fatigue among Generation Z consumers in the selection of sunscreen products in Bali Province. The higher the exposure to information received by consumers, the greater the level of mental fatigue and the tendency to delay purchases, as consumers experience difficulty in filtering and evaluating product information. Meanwhile, choice overload has been shown to have a positive but statistically insignificant effect on delayed purchase decisions, although it has a positive and significant effect on decision fatigue.

This indicates that a large number of product alternatives does not directly lead to purchase delays because Gen Z consumers tend to be accustomed to diverse choices in digital environments. The study also found that decision fatigue has a positive and significant effect on the postponement of purchase decisions, where consumers experiencing mental fatigue tend to feel confused, hesitant, and choose to delay purchases. In addition, decision fatigue has been proven to partially mediate the effect of information overload on delayed purchase decisions and fully mediate the effect of choice overload on delayed purchase decisions, indicating that decision fatigue is the primary psychological mechanism explaining delayed purchasing behavior among Gen Z consumers toward sunscreen products.

This study makes several theoretical contributions to the existing literature. First, it extends the application of Stimulus–Organism–Response (S-O-R) theory by empirically demonstrating that multichannel information and choice exposure function as environmental stimuli that trigger cognitive-affective processes (decision fatigue) leading to behavioral responses (purchase delay) in the context of personal care product decision-making. Second, it advances Cognitive Load Theory by providing evidence that cognitive overload in consumer decision-making does not manifest as immediate choice failure but rather as a gradual fatigue process that mediates the relationship between environmental complexity and behavioral outcomes. Third, this study contributes a validated integrative model that simultaneously examines information overload, choice overload, decision fatigue, and delayed purchase decisions, addressing a gap in the literature where these constructs have predominantly been studied in isolation. These contributions collectively enrich theoretical understanding of how digital multichannel environments influence consumer decision-making processes, particularly among Generation Z populations.

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AUTHOR CONTRIBUTION STATEMENT

Ketut Ari Satya Utami contributed to the conceptualization of the study, research design, data analysis using PLS-SEM, and preparation of the original manuscript. Putu Dyah Permatha Korry assisted in methodology development, data interpretation, and manuscript revision. Kadek Wulandari Laksmi P contributed to data collection, literature review, and result validation. I Gusti Ngurah Oka Ariwangsa supervised the research process, provided theoretical guidance, and critically reviewed the manuscript. All authors have read, revised, and approved the final version of the manuscript.

REFERENCES

- Ahmed, S. Y., & Pardaev, J. (2025). Human-AI decision dynamics: how risk propensity and trust impact choices through decision fatigue, conditional on AI understanding. *Decision Making: Applications in Management and Engineering*, 8(2), 96–113.
- Al-Youzbaky, B. A., Hanna, R. D., & Najeeb, S. H. (2022). The effect of information overload, and social media fatigue on online consumers purchasing decisions: the mediating role of technostress and information anxiety. *Journal of System and Management Sciences*, 12(2), 195-220.
- Arnold, M., Goldschmitt, M., & Rigotti, T. (2023). Dealing with information overload: a comprehensive review. *Frontiers in Psychology*, 14, 1122200. <https://doi.org/10.3389/fpsyg.2023.1122200>
- Asokan-Ajitha, A. (2021). Role of impulsiveness in online purchase completion intentions: an empirical study among Indian customers. *Journal of Indian Business Research*, 13(2), 189-222.
- Azhar, M., Akhtar, M. J., Rahman, M. N., & Khan, F. A. (2025). Measuring buying intention of generation Z on social networking sites: an application of social commerce adoption model. *Journal of Economic and Administrative Sciences*, 41(3), 979–1001.
- Ball, S., Katz, B., Li, F., & Smith, A. (2023). The effect of cognitive load on economic decision-making: a replication attempt. *Journal of Economic Behavior & Organization*, 210, 226–242. <https://doi.org/10.1016/j.jebo.2023.04.015>
- Basso, K., Duschitz, C. D. C., Giacomazzi, C. M., Sonogo, M., Rossi, C. A. V., & Reck, D. (2019). Purchase decision and purchase delay of hedonic and utilitarian products in the face of time pressure and multiplicity of options. *Revista de gestão*, 26(2), 112-125.
- Blackley, C., Redmond, P., & Peel, K. (2021). Teacher decision-making in the classroom: the influence of cognitive load and teacher affect. *Journal of Education for Teaching*, 47(4), 548–561. <https://doi.org/10.1080/02607476.2021.1942838>
- Bojilova, R., Mukhtarov, P., & Miloshev, N. (2022). Dependence of the index of biologically active ultraviolet radiation on the season and time of day. *Atmosphere*, 13(9), 1455. <https://doi.org/10.3390/atmos13091455>
- Canarslan, N. Ö. (2025). The Impact of Choice Overload and Decision Fatigue on Cart Abandonment in Online Shopping. *OPUS Journal of Society Research*, 22(6), 1331–1346.
- Chavan, S. (2024). *The decision paradox: Complex journey of decisions out of choices: A guide to thoughtful decision-making in today's modern life*. Gyrus Vision.
- Cicea, C., Marinescu, C., & Banacu, C. S. (2022). Multi-channel and omni-channel retailing in the scientific literature: A text mining approach. *Journal of Theoretical and Applied Electronic Commerce Research*, 18(1), 19–36. <https://doi.org/10.3390/jtaer18010002>
- Dahlquist, S., & Garver, M. S. (2022). Effects of product and product company information on generation Zs' purchasing preferences. *American Business Review*, 25(1), 11. <https://doi.org/10.37625/abr.25.1.11>
- Dave, K. A., Ashfaq, M. Z., Nidha, T. T., Aftab, M., Kazim, S., & Mukthar, K. P. J. (2024). Effect of social media fatigue on purchasing decisions with reference to Gen-Z consumers. In *Achieving Sustainable Business Through AI, Technology Education and Computer Science: Volume 2: Teaching Technology and Business Sustainability* (pp. 399–413). Springer.
- de Troya-Martín, M., Rodríguez-Martínez, A., Rivas-Ruiz, F., Subert, A., Arellano-Mendoza, M., Calzavara-Pinton, P., de Gálvez, M. V., Gilaberte, Y., Goh, C., & Lim, H. W. (2025). Personalized photoprotection: expert consensus and recommendations from a Delphi study among dermatologists. *Photodermatology, Photoimmunology & Photomedicine*, 41(1), e70001.
- Duan, W., Zhou, S., Scalia, M. J., Yin, X., Weng, N., Zhang, R., Freeman, G., McNeese, N., Gorman, J., & Tolston, M. (2024). Understanding the evolvement of trust over time within Human-AI teams. *Proceedings of the ACM on Human-Computer Interaction*, 8(CSCW2), 1–31.
- Eppler, M. J., & Mengis, J. (2004). The concept of information overload: A review of literature from organization science, accounting, marketing, MIS, and related disciplines. *The Information Society*, 20(5), 325–344. <https://doi.org/10.1080/01972240490507974>
- Furquim, T. S. G., Da Veiga, C. P., Veiga, C. R. P. da, & Silva, W. V. da. (2022). The different phases of

- the omnichannel consumer buying journey: a systematic literature review and future research directions. *Journal of Theoretical and Applied Electronic Commerce Research*, 18(1), 79–104. <https://doi.org/10.3390/jtaer18010005>
- Ghandour, R. (2024). Multimodal presentation of E-commerce product reviews and ratings: empirical investigation using multimodality. *Journal of Trade Science*, 12(4), 247–267.
- Guo, R., & Li, H. (2022). Can the amount of information and information presentation reduce choice overload? An empirical study of online hotel booking. *Journal of Travel & Tourism Marketing*, 39(1), 87–108. <https://doi.org/10.1080/10548408.2022.2045244>
- Guo, Y., Ji, M., Yang, Z., Wang, H., & You, X. (2022). Mindfulness and burnout among Chinese civil pilots: mediation through fatigue and proactive coping. *Social Behavior and Personality: An International Journal*, 50(3), 52–64. <https://doi.org/10.2224/sbp.11181>
- Hills, T. T., Noguchi, T., & Gibbert, M. (2013). Information overload or search-amplified risk? Set size and order effects on decisions from experience. *Psychonomic Bulletin & Review*, 20(5), 1023–1031. <https://doi.org/10.3758/s13423-013-0427-4>
- Huang, Y., & Suo, L. (2025). The impact of consumer confusion on Chinese consumers' delayed choices in online shopping: The mediating role of negative emotions. *Community and Social Development Journal*, 26(1), 1-15.
- Jabr, W., & Rahman, M. S. (2022). Online reviews and information overload: The role of selective, parsimonious, and concordant top reviews. *MIS Quarterly*, 46(3), 1517–1550. <https://doi.org/10.25300/MISQ/2022/16550>
- Kishor, J., Bhardwaj, S. K., & Sharma, S. (2023). An evaluation model for measuring the impact of omnichannel information processing on digital shopping decision. *International Journal of Procurement Management*, 17(2), 255–276.
- Malhotra, N. K. (1982). Information load and consumer decision making. *Journal of Consumer Research*, 419–430. <https://doi.org/10.1086/208882>
- McKnight, G., Shah, J., & Hargest, R. (2022). Physiology of the skin. *Surgery (Oxford)*, 40(1), 8–12. <https://doi.org/10.1016/j.mpsur.2021.11.006>
- Mustikasari, A., Hurriyati, R., Dirgantari, P. D., Sultan, M. A., & Sugiana, N. S. S. (2025). The Role of Artificial Intelligence in Brand Experience: Shaping Consumer Behavior and Driving Repurchase Decisions. *International Journal of Advanced Computer Science & Applications*, 16(4).
- Nitulescu, G., Lupuliasa, D., Adam-Dima, I., & Nitulescu, G. M. (2023). *Ultraviolet Filters for Cosmetic Applications. Cosmetics 2023*, 10, 101. <https://doi.org/10.3390/cosmetics10040101>
- Passeron, T., Dreno, B., Puig, S., Goh, C. L., Kang, H. Y., Ly, F., Morita, A., Ocampo Candiani, J., Schalka, S., & Wei, L. (2024). Outdoor workers and sun exposure: Results of an international survey on sun exposure behaviours and knowledge among 17 countries, the HELIOS project. *Journal of the European Academy of Dermatology and Venereology*, 38(11), e939–e942. <https://doi.org/10.1111/jdv.19826>
- Peng, M., Xu, Z., & Huang, H. (2021). How does information overload affect consumers' online decision process? An event-related potentials study. *Frontiers in Neuroscience*, 15, 695852.
- Portilho, L., Aiello, L. M., Vasques, L. I., Bagatin, E., & Leonardi, G. R. (2022). Effectiveness of sunscreens and factors influencing sun protection: a review. *Brazilian Journal of Pharmaceutical Sciences*, 58, e20693. <https://doi.org/10.1590/s2175-97902022e20693>
- Portilho, L., & Leonardi, G. R. (2020). The real protection of facial sunscreens. *British Journal of Dermatology*, 182(4), 1050–1052. <https://doi.org/10.1111/bjd.18731>
- Pranindyasari, C., & Uscha, C. M. (2025). The Role of Omnichannel Retailing on Customer Retention Mediated by Brand Experience in Cosmetics Retail: SOR Approach. *Journal of Marketing Innovation (JMI)*, 5(1).
- Rigel, D. S., Taylor, S. C., Lim, H. W., Alexis, A. F., Armstrong, A. W., Fuxench, Z. C. C., Draelos, Z. D., & Hamzavi, I. H. (2022). Photoprotection for skin of all color: Consensus and clinical guidance from an expert panel. *Journal of the American Academy of Dermatology*, 86(3), S1–S8. <https://doi.org/10.1016/j.jaad.2021.12.019>
- Roy, S. K., Sarkar, U., Khan, M. R., Pervin, M. T., & Ahad, A. Al. (2025). Generation Z's Behavioral Factors Affecting Purchase Intention Through Social Media Portals: A Hybrid PLS-SEM and ANN Modeling Approach. *SAGE Open*, 15(3), 21582440251363320.

- <https://doi.org/10.1177/21582440251363320>
- Sharma, R., Srivastva, S., & Fatima, S. (2023). E-commerce and digital transformation: Trends, challenges, and implications. *Int. J. Multidiscip. Res.(IJFMR)*, 5(5).
- Simamora, V., & Islami, P. (2023). Millennial and generation Z online purchasing decisions on Indonesian marketplace. *Journal Research of Social Science, Economics, and Management*, 2(8), 1706–1721.
- Tang, Y. C., Hsieh, Y. C., & Chiu, H. C. (2017). Purchase decision: does too much choice leave us unhappy?. *European Journal of Marketing*, 51(7-8), 1248-1265.
- van Bodegraven, M., Kröger, M., Zamudio Díaz, D. F., Lohan, S. B., Moritz, R. K. C., Möller, N., Knoblich, C., Vogelsang, A., Milinic, Z., & Hallhuber, M. (2024). Redefine photoprotection: Sun protection beyond sunburn. *Experimental Dermatology*, 33(1), e15002. <https://doi.org/10.1111/exd.15002>
- Van Nguyen, A. T., McClelland, R., & Thuan, N. H. (2024). Omni-channel customer segmentation: a personalized customer journey perspective. *Journal of Consumer Behaviour*, 23(6), 3253–3275. <https://doi.org/10.1002/cb.2274>