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THE IMPACT OF SOCIAL NETWORK MARKETING AND VALUE CO-CREATION ON PURCHASE BEHAVIOR: PLS-SEM AND NCA ANALYSIS IN THE E-COMMERCE MARKET

Akın ESMERAY[1]

[1]**Department of Statistics, Faculty of Science, Eskişehir Osmangazi University, Eskişehir, Türkiye**

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Corresponding Author:
Akın ESMERAY

ABSTRACT

The aim of this study is to examine the effects of social network marketing activities on consumer purchase behavior through value co-creation in the context of e-commerce. Grounded in the Stimulus-Organism-Response (S-O-R) model, the study analyzes how the entertainment and interaction dimensions of social network marketing transform into purchase behavior via perceived economic and hedonic values. The research data were collected via an online survey from consumers who actively use e-commerce platforms. The proposed research model was tested using Partial Least Squares Structural Equation Modeling (PLS-SEM). Additionally, a hybrid approach was employed, utilizing Artificial Neural Networks (ANN) to detect non-linear relationships and Necessary Condition Analysis (NCA) to identify mandatory antecedents between variables. The findings indicate that perceptions of entertainment and interaction regarding social network marketing play a significant role in the creation of both economic and hedonic value. While perceived economic value was found to have a strong and significant effect on purchase behavior, the direct effect of hedonic value remained limited. NCA results confirmed that economic value is a "necessary condition" for purchase behavior to occur. Furthermore, the ANN analysis revealed that, contrary to the linear model, the "Interaction" dimension is the highest determinant (100% normalized importance) in the purchase decision. Moreover, Multi-Group Analysis (MGA) results demonstrated that purchase behavior sharply diverges by gender; specifically, women exhibit behavior oriented towards "economic value" (benefit), while men are driven by "hedonic value" (pleasure). By revealing the rational and experiential value-generating capacity of social network marketing through a multi-dimensional hybrid methodology, this study offers a unique contribution to the literature.

1. INTRODUCTION

The marketing understanding of the twenty-first century is being reshaped within the framework of “Service-Dominant Logic” (S-D Logic). In this new paradigm, value is not a static output produced by firms in factories and offered to customers; rather, it is a phenomenological phenomenon that emerges during the usage process (value-in-use) because of the interaction between the customer and the firm (Vargo & Lusch, 2004). Social media platforms appear as the areas where this “co-creation” process is most intensely experienced. Consumers are no longer passive recipients but active stakeholders who contribute to the brand’s story, disseminate content, and even guide product development (Cheung et al., 2021).

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However, most studies in the literature use “symmetrical” and “sufficiency-oriented” analysis methods (e.g., Multiple Regression, CB-SEM, classical PLS-SEM) when examining the effect of social media marketing activities on purchase intention (Hair et al., 2019). These methods depend on the logic that “as factor X increases, factor Y also increases” (e.g., more entertainment leads to more purchases). Yet complex human behaviors in the real world do not always follow this linearity. Some factors, while not increasing success with their presence, guarantee failure with their absence. At this point, Necessary Condition Analysis (NCA), developed by Dul (2016), comes into play.

1.1. Problem Definition

The fundamental problem of this research is as follows: Brands allocate large budgets to produce "entertaining" and "interactive" content on social media. However, it is unclear which of these investments fall into the "must-have" (necessary) category and which fall into the "nice-to-have" (sufficient) category. For example, even if a brand offers very entertaining content, if the "economic value" (discount, price advantage) is below a certain threshold level, purchase behavior may not occur at all. This study aims to identify which value dimension (Hedonic or Economic) creates a bottleneck while examining the effect of SNM activities on CPB through VCC.

1.2. The Original Value of the Study

This study offers significant contributions to literature both theoretically and methodologically by addressing the relationship between social network marketing and value co-creation in the context of consumer purchase behavior. Primarily, a multi-method approach, which is becoming increasingly widespread in social sciences, has been adopted; the power of PLS-SEM in explaining structural relationships and the ability of Necessary Condition Analysis (NCA) to identify critical factors have been integrated within a single model framework (Dul, 2016). In addition, Artificial Neural Networks (ANN) analysis based on artificial intelligence has been integrated into the model to decipher the complex and non-linear structure of human behavior.

Another original contribution of the study is the conceptualization of the value co-creation (VCC) concept in two sub-dimensions as hedonic and economic value, separating it from the one-dimensional structure widely addressed in the literature. This distinction, made based on Verleye (2015) and Yi and Gong (2013), allows for a clearer demonstration of the different and sometimes opposing effects of value types on purchase behavior. Furthermore, because

consumer behaviors are not homogeneous, the study thoroughly examines how value perception differs by gender using Multi-Group Analysis (MGA). This analysis brings a new dimension to theoretical discussions in the literature by revealing which value type (rational or emotional) is dominant in the purchasing decisions of female and male consumers (Meyers-Levy & Loken, 2015).

2. LITERATURE REVIEW

In this section, the theories and fundamental variables that form the conceptual skeleton of the research will be detailed considering the provided research materials.

2.1.Service-Dominant Logic (S-D Logic) and Value Co-Creation (VCC)

Proposed by Vargo & Lusch (2004), S-D Logic has shifted the focus of marketing from "goods exchange" to "service exchange." According to this approach, the customer is always a co-creator of value. In the context of social networks, this occurs not just through a customer purchasing a product, but by sharing their experience about that product or brand, interacting with other users, and contributing to the brand community (See-To & Ho, 2014). This interaction process between the consumer and the brand supports value co-creation in the context of digital storytelling (Sönmez & Yılmaz, 2020) and strengthens brand personality through brand communities (Evirgen, 2019).

Dimensions of Value Co-Creation: In the literature, VCC is addressed as a multi-dimensional construct. Verleye (2015) classified the co-creation experience into six dimensions: hedonic, cognitive, social, personal, pragmatic, and economic. However, it is observed that the most prominent effects on consumer purchase behavior cluster around "emotional/experiential" and "rational/utilitarian" axes. Therefore, in this research, VCC is addressed in two main dimensions:

Hedonic Value: Refers to the pleasure, fun, and excitement the consumer derives from the co-creation process. It is related to intrinsic motivations. For example, participating in an Instagram contest or using a brand's filter is valuable because it is fun, even if there is no reward at the end (Yi & Gong, 2013).

Economic Value: Refers to the financial or material gains the consumer obtains in return for the effort spent. It is related to extrinsic motivations. Discount coupons, special price offers, or earning reward points fall into this category (Stigler, 1961).

Distinguishing these two dimensions is critical because the literature indicates that hedonic and utilitarian (economic) values follow different motivational paths on purchase behavior.

2.2.Social Network Marketing (SNM) and Its Dimensions

Social network marketing is the process by which brands use social media platforms to communicate with consumers, ensure interaction, and create value. In their pioneering study, Kim and Ko (2012) defined social media marketing activities in five dimensions: Entertainment, Interaction, Trendiness, Customization, and Word-of-Mouth (WOM). Current research supports that these activities trigger value co-creation and engagement (Cheung et al., 2021). Studies conducted in Türkiye also demonstrate that marketing activities on social media increase brand loyalty (Aydın, 2020), trigger purchase intention through perceived herd behavior (Can & Kaya, 2018), and have a direct significant effect on purchase intention (Karalar & Kiracı, 2017). In this research project, to keep the model focused and manageable, the two main dimensions that most directly trigger the VCC process, Entertainment and Interaction, have been centered upon.

- **Entertainment:** The primary reason for social media users to be on platforms is to spend enjoyable time. According to Kim and Ko (2012), the entertainment dimension is the sense of pleasure and excitement created in the user by the content offered by the brand. Entertaining content enables the consumer to develop a positive attitude towards the brand and is the antecedent of hedonic value in the context of S-D Logic.

- **Interaction:** The biggest difference of social media from traditional media is that it allows for two-way communication. Interaction is the ability of users to exchange ideas with the brand or other users, produce content, and receive feedback from the brand. Interaction contributes to the consumer making more accurate decisions (economic/pragmatic value) by reducing information asymmetry (Cheung et al., 2021; Yüksekbilgili, 2018).

2.3.Para-Social Interaction (PSI)

Another concept frequently emphasized in research materials that enhances the originality of this study is Para-Social Interaction. Defined for the first time by Horton and Wohl (1956) as "intimacy at a distance," PSI is the one-sided, illusionary friendship relationship that media users develop with media figures (celebrities, influencers, or brands).

In the context of social media, PSI is the state of the consumer feeling the brand or brand representative (influencer) "like a friend." Labrecque (2014) states that the interactive nature of social media strengthens PSI, which has a direct effect on loyalty and purchase intention. In this study, PSI is addressed as a theoretical complement to the "Interaction" dimension, and nuances measuring this "virtual friendship" feeling established by the consumer with the brand are added to the scale items. Especially in live streaming e-commerce, it has been proven that PSI triggers the impulse to purchase. This type of interaction increases consumers' purchase intention by combining with credibility and expertise perception, particularly in influencer marketing (Şahin & Şafak, 2023). In the evolving digital landscape of 2022-2024, the role of PSI has deepened through the lens of "homophily" the perceived similarity between followers and influencers. Recent evidence suggests that attitude homophily significantly strengthens the parasocial bond, acting as a serial mediator between social media engagement and purchase intention (Vrontis et al., 2024). Furthermore, influencer credibility is no longer just about expertise but "relatability"; consumers increasingly favor influencers who provide authentic, unfiltered content over traditional celebrity endorsements, making PSI a more potent driver of emotional value in the VCC process (Vrontis et al., 2024; El-Haddad et al., 2024).

2.4.Consumer Purchase Behavior (CPB)

Consumer purchase behavior encompasses the processes of a consumer searching for, selecting, purchasing, using, and disposing of a product or service. In the context of e-commerce, CPB is generally measured through "purchase intention" (Husnain & Toor, 2017). In this study, CPB is operationalized as the likelihood of the consumer shopping from the brand and their tendency to recommend it (Reichheld, 2003).

2.5.The Moderating Role of Gender

In consumer behavior literature, gender is accepted as one of the fundamental demographic variables affecting information processing and purchase decision mechanisms. According to the **Selectivity Model** theory, males generally process information holistically and focus on heuristics (results), while females conduct a more detailed and comprehensive information processing process (Meyers-Levy & Loken, 2015).

This theoretical distinction manifests itself in the context of social commerce and e-commerce as well. While female consumers generally seek risk minimization, price advantage, and utility maximization (**economic value**) during the shopping process, male consumers tend to perceive

shopping as a process focused on experience, speed, and entertainment (**hedonic value**) rather than a task. In the social network marketing literature, addressing gender as a moderator variable is of critical importance to understand the differences in the transformation of value perception into purchase behavior. Based on this theoretical foundation, this study aims to examine whether the values created by social network marketing translate into different behavioral outcomes in female and male consumers.

2.6.Emerging Paradigms: Social Commerce and AI-Supported Marketing

The recent integration of social commerce (SC) and artificial intelligence (AI) has significantly reshaped the S-O-R (Stimulus-Organism-Response) framework. Recent studies emphasize that SC is not merely a transactional tool but a platform for "Customer-to-Customer Value Co-Creation" (C2CVCC). For instance, ratings, reviews, and community forums are identified as critical drivers that bridge social interactions with sustainable customer relationships (Alhumud & Elshaer, 2024). In these environments, value is co-created horizontally among peers, reducing information asymmetry and enhancing the economic value of the purchase.

Concurrently, AI-supported marketing has introduced "hyper-personalization" as a new stimulus. AI algorithms analyze vast datasets to deliver predictive recommendations, thereby optimizing the consumer's cognitive load and increasing purchase intention through enhanced customer experience (Dabbous et al., 2023; Dwivedi et al., 2024). Generative AI (AIGC) has also emerged as a tool for rapid content creation; however, empirical findings suggest that while AI-generated content improves engagement and satisfaction, it may still lag behind human-created content in terms of eliciting deep positive emotions and trust (Li et al., 2024). These technologies act as catalysts for the VCC process by ensuring that the right stimulus reaches the right organism at the optimal time.

3. CONCEPTUAL MODEL AND HYPOTHESES

In this study, the effect of social network marketing activities on consumer purchase behavior was examined with a multi-method approach. The basis of the research model is formed by the Stimulus-Organism-Response (S-O-R) paradigm, which explains the effect of environmental factors on human behavior (Mehrabian & Russell, 1974). In the model, Social Network Marketing (SNM) activities (Entertainment and Interaction) are positioned as “Stimulus (S)”, the Value Co-Creation (VCC) perception formed in the consumer’s mind (Hedonic and

Economic) as “Organism (O)”, and the final Consumer Purchase Behavior (CPB) as “Response (R)”.

To increase the methodological power of the research, “Methodological Triangulation” was applied. In this context; (1) PLS-SEM to measure the structural relationships and effect coefficients between variables, (2) Multi-Group Analysis (MGA) to test whether these relationships differ according to gender, (3) Necessary Condition Analysis (NCA) to determine the “sine qua non” factors for purchase success, and (4) Artificial Neural Networks (ANN) analysis based on artificial intelligence to detect non-linear complex relationships were integrated into the model (Figure 1).

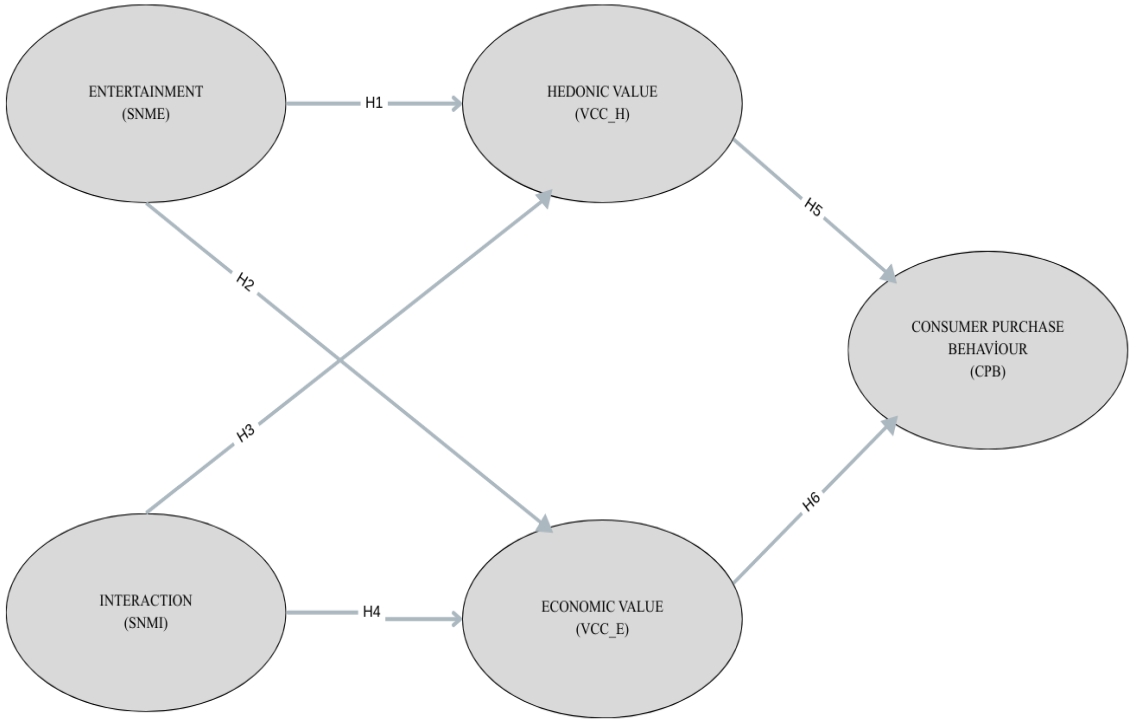

Figure 1. Conceptual Model and Hypotheses

3.1.Social Network Marketing and Value Creation (H1-H4)

Kim and Ko (2012) stated in their study on luxury brands that social media marketing (entertainment, interaction, trendiness, etc.) increases customer value. Cheung et al. (2021), on the other hand, argue that social media activities create both functional (economic) and emotional (hedonic) value in consumers. While entertaining content creates instant pleasure in the consumer, the interaction dimension supports rational benefit by providing information exchange. From an S-O-R perspective, SNM activities serve as compelling environmental

stimuli (S) that evoke users' cognitive and affective internal states (O). According to S-D Logic, this stimulus-driven engagement naturally facilitates value co-creation, as consumers actively integrate these digital resources to derive both experiential (hedonic) and utilitarian (economic) benefits.

H1: Social Media Entertainment (SNME) activities positively affect consumers' Hedonic Value (VCC_H) perception.

H2: Social Media Entertainment (SNME) activities positively affect consumers' Economic Value (VCC_E) perception.

H3: Social Media Interaction (SNMI) positively affects consumers' Hedonic Value (VCC_H) perception.

H4: Social Media Interaction (SNMI) positively affects consumers' Economic Value (VCC_E) perception.

3.2.Value Creation and Purchase Behavior (CPB)

Prahalad and Ramaswamy (2004) suggest that value is not one-sided but co-created with the customer (Co-Creation) and that this process turns into behavioral loyalty. See-To and Ho (2014) proved that value perception, especially in social media, triggers purchase intention. Consumers give a purchase response because of the benefit (economic) they obtain or the pleasure (hedonic) they experience. Within the S-O-R paradigm, the perceived value acts as the crucial organismic state (O) that dictates the final behavioral response (R). When consumers internally process the co-created value-whether driven by emotional gratification or rational utility-it significantly reduces purchase uncertainty and accelerates the behavioral action.

H5: Perceived Hedonic Value (VCC_H) positively and significantly affects Purchase Behavior (CPB).

H6: Perceived Economic Value (VCC_E) positively and significantly affects Purchase Behavior (CPB).

3.3. The Moderating Role of Gender (H7 - MGA Hypothesis)

In the consumer behavior literature, Meyers-Levy and Loken (2015) state that gender is an important discriminator in information processing and decision-making processes. It is assumed

that women generally act "benefit and risk-oriented" (rational/economic), while men act "experience and speed-oriented" (hedonic). The Selectivity Model suggests that socialization differences lead men and women to adopt distinct heuristic processing strategies. Therefore, the translation of perceived value into an actual purchase response is not uniform but structurally moderated by gender-based cognitive schemas.

H7: The effect of perceived value types (Economic and Hedonic) on purchase behavior shows a statistically significant difference according to the "gender" variable.

3.4. Necessity Hypotheses (H8 - NCA Hypotheses)

According to the NCA theory developed by Dul (2016), although some factors are not "sufficient" for success (purchase), they can be "necessary". While traditional regression logic says, "if X increases, Y increases", NCA logic tests the bottleneck of "if X does not exist at a certain level, Y never occurs". While traditional symmetric models assume all factors additively contribute to an outcome, NCA posits that certain conditions act as critical bottlenecks. Without achieving a baseline threshold of economic or hedonic value, the purchase mechanism fundamentally fails to trigger, regardless of other positive stimuli.

H8a: To obtain a high level of Purchase Behavior (CPB), Economic Value (VCC_E) is a necessary condition.

H8b: To obtain a high level of Purchase Behavior (CPB), Hedonic Value (VCC_H) is a necessary condition.

4. METHODOLOGY

In this section, the research design, sample structure, data collection tools, and data analysis methods are detailed.

4.1.Population and Sample

The universe of the research consists of consumers in Türkiye who follow social media platforms and have the potential to shop via e-commerce sites. Due to the population volume not being known exactly and reaching all units creating time and cost constraints, "convenience sampling", one of the non-probability sampling methods, was preferred in the research. The data collection process was carried out via an online survey form; a total of 215 responses were initially collected. After eliminating 49 incomplete, erroneous, or inconsistent answers, the data

belonging to 166 participants deemed suitable for analysis were included in the scope of the study.

The adequacy of the sample size was evaluated by considering the basic criteria in the Partial Least Squares Structural Equation Modeling (PLS-SEM) literature. Hair et al. (2019) state that the PLS-SEM method provides high statistical power even in smaller sample sizes compared to covariance-based SEM (CB-SEM) methods. In this context, the "10-times rule" widely accepted in the literature was taken as a basis for sample adequacy. Based on Barclay et al. (1995), considering the number of structural links pointing to the dependent variable with the most arrows (paths) in the research model, it was accepted that the sample size of 166 units met the required minimum size and was sufficient to ensure the statistical power of the model.

In addition to the traditional minimum sample size requirements, a post-hoc power analysis was conducted using G*Power 3.1 software (Faul et al., 2009) to further validate the adequacy of the sample. With a total sample size of 166, an effect size (f^2) of 0.15, and an alpha level of 0.05, the statistical power was calculated as 0.985. This value significantly exceeds the recommended threshold of 0.80, confirming that the study possesses more than sufficient statistical power to detect meaningful relationships within the proposed model.

4.2. Data Collection Tool

The survey form used in the research consists of two parts. In the first part, there are questions aimed at determining the demographic characteristics (gender, age, education, income, etc.) and social media usage habits of the participants. In the second part, there are statements aimed at measuring the variables in the research model (Entertainment, Interaction, Economic Value, Hedonic Value, and Purchase Behavior). The full list of measurement items is presented in the Appendix.

Scale items were adapted from studies with proven reliability in the literature (Kim & Ko, 2012; Godey et al., 2016). All statements were measured with a 5-point Likert type rating scale (1: Strongly Disagree ... 5: Strongly Agree). The adaptation of the used scales to Turkish culture and validity studies show parallelism with the relevant literature (Yüksekbilgili, 2018).

4.3.Data Analysis

The analysis of the obtained data was carried out with the "Multi-Stage Hybrid Modeling" approach to increase the depth of the research. IBM SPSS Statistics 26.0 and SmartPLS 4.0

software were used in the analysis process. The applied analysis steps are respectively as follows:

Descriptive Analyses: SPSS program was used for the determination of the demographic profiles of the participants, data cleaning, and frequency distributions.

Measurement and Structural Model (PLS-SEM): Partial Least Squares Structural Equation Modeling (PLS-SEM) was preferred for the test of the research model. In the first stage, reliability (Cronbach's Alpha, CR) and validity (AVE, HTMT, Fornell-Larcker) tests of the measurement model were performed; in the second stage, the structural model (hypothesis tests) was analyzed using the Bootstrapping technique (5000 subsamples).

Multi-Group Analysis (PLS-MGA): Non-parametric PLS-MGA analysis was applied to test whether the relationships between variables differ according to gender (female-male) groups.

Necessary Condition Analysis (NCA): The NCA method was used to determine whether independent variables are not only a "sufficient" but also a "necessary" condition on the outcome variable (purchase).

Artificial Neural Networks (ANN): In the final stage, Artificial Neural Networks (ANN) analysis based on artificial intelligence was applied to verify the linear relationships obtained with PLS-SEM and to detect non-linear complex relationships between variables. Additionally, current methodological guidelines and criteria proposed by Yılmaz Uz (2025) were adopted for reporting and interpreting the PLS-SEM analysis results.

5. FINDINGS

In this section, the analysis results regarding the testing of the research model are presented. The analysis of the data was carried out using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method via the SmartPLS 4.0 statistical software package. The analysis process was handled in four stages: demographic characteristics of participants, assessment of the measurement model, testing of the structural model (hypothesis analyses), and multi-group analysis (MGA). During the analysis process, Necessary Condition Analysis (NCA), which reveals the necessity relationships between variables, and sampling approaches were considered (Baltacı, 2024; Dul, 2024). The combined use of PLS-SEM and NCA methods offers a more holistic perspective in explaining consumer behaviors (Arbabi et al., 2022).

5.1. Demographic Characteristics

The demographic characteristics and social media usage habits of the 166 participants constituting the research sample are detailed in (Table 1). When the gender distribution of the participants is examined, it is seen that 60.2% consist of female and 39.8% of male consumers. When looking at the age distribution, it is noteworthy that the sample represents a quite young profile. Most of the participants (66.3%) are in the "22 years and below" group, followed by the "23-37 years" range with 32.5%. The rate of participants aged 38 and above is quite limited at 1.2%.

When evaluated in terms of educational status, it was determined that the participants received education at the "Bachelor's (4 Years)" level with a high rate of 82.5%. These data indicate that the research focuses on the Z and Y generations, who are educated and tech-savvy, termed as "digital natives." When the perceived income level of the participants is examined; it was observed that 61.4% defined themselves in the "Middle-Upper" income group capable of saving, while 34.3% were in the "Middle-Lower" group. Looking at the frequency of social media usage, which is the main subject of the research, it is understood that the audience is quite active. 40.4% of the participants spend 3-5 hours a day on social media, while 34.9% spend between 1-3 hours. The rate of usage for more than 5 hours a day is 18.7%. These findings confirm that the potential of the sample group to be exposed to social network marketing activities is quite high.

Table 1.
Demographic Characteristics of the Participants

Variable	Variable levels	Frequency	Percent (%)
Gender			
	Female	100	60.2
	Male	66	39.8
Age			
	22 and below	110	66.3
	23-37	54	32.5
	38-50	2	1.2
Education Level			
	High School and Below	16	9.6
	Associate degree	10	6.0
	Bachelor’s Degree (4 Years)	137	82.5
	Postgraduate	3	1.8
Income Level			
	Low	4	2.4
	Lower-Middle (Just making ends meet)	57	34.3
	Upper-Middle (Able to save	102	61.4
	High	3	1.8
Daily Social Media Usage			
	Less than 1 Hour	10	6.0
	1-3 Hours	58	34.9
	3-5 Hours	67	40.4
	More than 5 Hours	31	18.7
Total		166	100

5.2.Assessment of the Measurement Model

In the first stage of the analysis process, the consistency and validity of the scales used in the research model were tested. This evaluation process was examined under three main headings: (1) Internal Consistency Reliability, (2) Convergent Validity, and (3) Collinearity Issue.

Internal Consistency Reliability: Cronbach's Alpha and Composite Reliability (CR) coefficients were calculated to test the reliability of the scales. The accepted threshold value in the literature is 0.70 (Hair et al., 2019). According to the analysis results, the CR values of all variables (in the range of 0.787 – 0.925) and Cronbach's Alpha coefficients are at the desired level. Although the Cronbach's Alpha value of the Interaction (SNMI) dimension (0.603) remained below the 0.70 limit, the scale was accepted as reliable since the rho_A (0.627) and CR (0.787) values, which are considered more reliable criteria for internal consistency in PLS-SEM, are within acceptable limits.

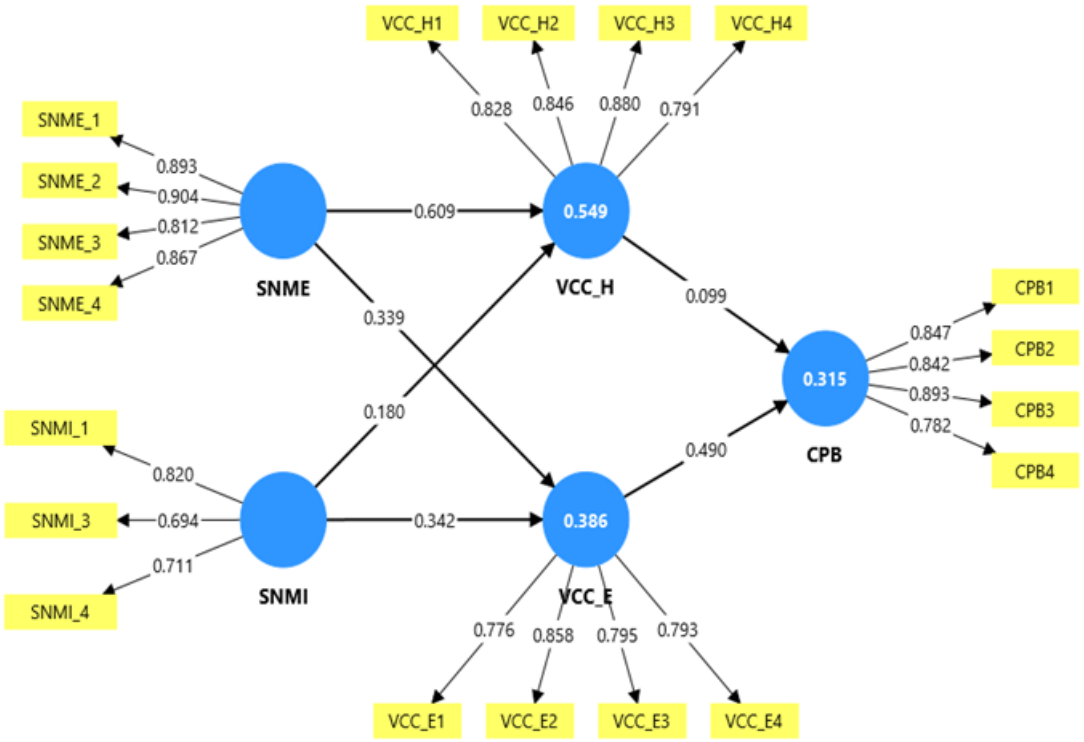

Figure 2. Factor Loadings

Convergent Validity: Average Variance Extracted (AVE) values were examined to determine how well each latent variable explains its own indicators. It is observed that the AVE values obtained for all variables are above the 0.50 threshold value (Fornell & Larcker, 1981). This proves that the scale items statistically strongly represent the relevant structure.

Indicator Reliability & Collinearity: The fact that the factor loadings of the items are above the 0.708 value indicates that indicator reliability is ensured (Table 2). Furthermore, Variance Inflation Factor (VIF) values were examined to test whether there is overlap among the items. As a result of the analysis, it was determined that the VIF value of no item exceeded the critical limit of 5.00. Detailed statistical findings, factor loadings, and reference information regarding these analyses are presented in Table 2 and Figure 2

Table 2.
Measurement Models, Convergent Validity and Reliability

Variables and Items	Factor Loadings	VIF
Consumer Purchase Behavior (CPB) (AVE = 0.709, C. alpha = 0.865, Rho_A = 0.896, CR = 0.907)		
CPB 1: I plan to purchase this brand's products/services (Husnain & Toor, 2017).	0.847	2.599
CPB 2: I prefer this brand over others when I need it. (Husnain & Toor, 2017)	0.842	2.882
CPB 3: I would recommend shopping from this brand to my close circle. (Reichheld, 2003)	0.893	3.180
CPB 4: It is highly likely that I will shop from this brand again in the future. (Husnain & Toor, 2017)	0.782	1.992
Value Co-Creation (VCC)		
VCC_E: Economic Value (AVE = 0.650, C. alpha = 0.820, Rho_A = 0.826, CR = 0.881)		
VCC_E 1: I obtain discounts or advantages by participating in this brand's social media activities. (Yi & Gong, 2013)	0.776	2.135
VCC_E 2: Interacting with this brand allows me to make better purchasing decisions. (Verleye, 2015)	0.858	2.671
VCC_E 3: Thanks to this brand's posts, I access information about products that I cannot find elsewhere. (Stigler, 1961)	0.795	1.894
VCC_E 4: Following this brand is worth the time and effort I spend (I get a return). (Verleye, 2015)	0.793	2.173
VCC_H: Hedonic Value (AVE = 0.701, C. alpha = 0.857, Rho_A = 0.860, CR = 0.903)		
VCC_H 1: Interacting with this brand gives me personal happiness. (Yi & Gong, 2013)	0.828	2.519
VCC_H 2: Contributing to the brand's content (liking, commenting, etc.) is fun. (Verleye, 2015)	0.846	2.515
VCC_H 3: Being part of this brand's community makes me feel good. (Tajfel, 1974)	0.880	2.765
VCC_H 4: The time I spend with this brand allows me to get away from daily stress. (Verleye, 2015)	0.791	2.140
Social Network Marketing (SNM)		
SNM-I: Interaction (AVE = 0.553, C. alpha = 0.603, Rho_A = 0.627, CR = 0.787)		
SNM-I 1**:** I can exchange ideas with other users on this brand's social media pages. (Kim & Ko, 2012)	0.820	1.829
SNM-I 2(R): It is difficult to communicate with the brand through its social media accounts. (Kim & Ko, 2012)	Control Item	Control Item
SNM-I 3**:** I can freely share my opinions about this brand's social media content. (Vargo & Lusch, 2004)	0.694	1.621
SNM-I 4: This brand sincerely responds to my questions and comments via social media. (Labrecque, 2014)	0.711	1.657
SNM-E: Entertainment (AVE = 0.756, C. alpha = 0.892, Rho_A = 0.892, CR = 0.925)		
SNM-E 1: I find this brand's social media posts entertaining. (Kim & Ko, 2012)	0.893	3.786
SNM-E 2: This brand's social media content is exciting. (Kim & Ko, 2012)	0.904	3.683
SNM-E 3: Spending time on this brand's social media is enjoyable for me. (Katz, Blumler, & Gurevitch, 1974)	0.812	2.241
SNM-E 4: This brand's social media posts keep my interest alive. (Kim & Ko, 2012)	0.867	3.236

Discriminant Validity: The "Discriminant Validity" analysis, which tests whether the variables are mixed with each other, was performed using the Fornell-Larcker criterion. The bold diagonal values in Table 3 (square root of AVE values) represent the specific variance of each variable. For a variable to be considered valid, its own diagonal value (e.g., 0.842 for Purchase Behavior) must be higher than all other correlation values in that column and row (0.404, 0.769, 0.628, 0.480). When Table 3 is examined, it is seen that all variables comply with this rule. This

confirms that the concepts of "Entertainment," "Interaction," and "Value" are perceived as distinct and clear concepts by the participants.

Additionally, HTMT ratios, which are a more current indicator of discriminant validity, were also examined (Table 4). In the literature, HTMT values are expected to be below the 0.90 threshold value (Henseler, Ringle, & Sarstedt, 2015). It is seen that all HTMT values obtained in the study are below this limit. Although the highest value was detected as 0.885 between Entertainment (SNME) and Interaction (SNMI) dimensions, discriminant validity is supported since this ratio does not exceed the 0.90 threshold.

Table 3.
Discriminant Validity (Fornell-Larcker Criterion)

	CPB	SNME	SNMI	VCC_E	VCC_H
CPB	**0.842**				
SNME	0.365	**0.869**			
SNMI	0.543	0.662	**0.744**		
VCC_E	0.556	0.565	0.567	**0.806**	
VCC_H	0.430	0.728	0.585	0.676	**0.837**

Table 4.
Discriminant Validity (HTMT Criterion)

	CPB	SNME	SNMI	VCC_E	VCC_H
CPB					
SNME	0.404				
SNMI	0.769	0.885			
VCC_E	0.628	0.657	0.778		
VCC_H	0.480	0.833	0.785	0.802	

5.3. Structural Model and Hypothesis Tests

After the measurement model met the reliability and validity criteria, the structural model analysis was proceeded to test the relationships in the proposed research model (Figure 3). The Bootstrapping technique (5000 subsamples) was used in testing the hypotheses, and the significance levels (t-value and p-value) of the path coefficients were examined.

Hedonic Value ($R^2 = 0.549$): Our model explains 54.9% of the change in the "Hedonic Value" (pleasure and happiness) perception formed in consumers. This indicates that social media activities (Entertainment and Interaction) are highly successful in giving pleasure to consumers.

Economic Value ($R^2 = 0.386$): Social media activities explain 38.6% of the economic benefit (discount, information, advantage) perceived by consumers.

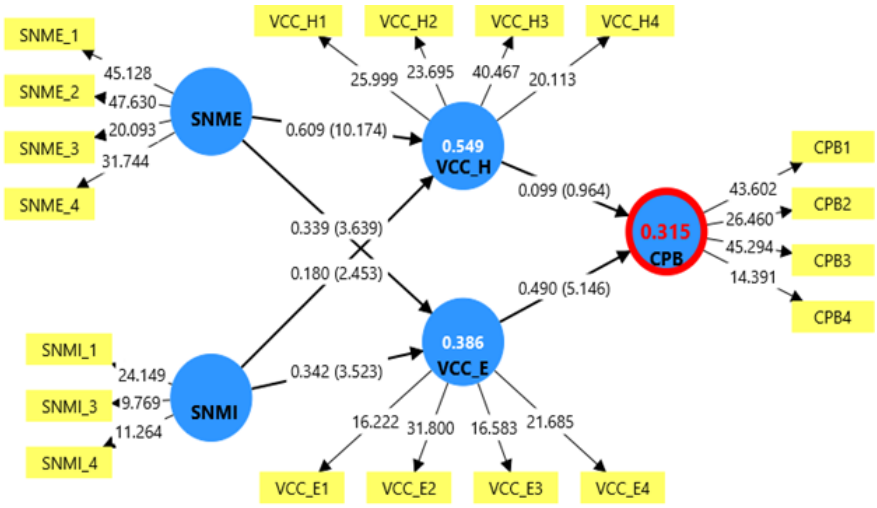

Figure 3. *Structural Model*

Purchase Behavior ($R^2 = 0.315$): As the most important result of the research; our model explains 31.5% of the change in consumers' purchase decisions. An explanation rate above 30% in a multi-factorial field like consumer behaviors is a level accepted and significant in the literature.

Table 5.
Hypothesis Test Results

Hypothesis	Relationship	Path Coefficient(β)	t-value	p-value	Decision
H1	SNME → VCC_H	0.609	10.174	p < 0.01	Supported
H2	SNME → VCC_E	0.339	3.639	p < 0.01	Supported
H3	SNMI → VCC_H	0.180	2.453	p < 0.05	Supported
H4	SNMI → VCC_E	0.342	3.523	p < 0.01	Supported
H5	VCC_H → CPB	0.099	0.964	0.335	Not Supported
H6	VCC_E → CPB	0.490	5.146	p < 0.01	Supported

According to the analysis results (Table 5), Entertainment and Interaction, which are the sub-dimensions of social media marketing, positively and significantly affect consumers' value perceptions (H1, H2, H3, and H4 supported). In particular, the effect of the Entertainment dimension on Hedonic Value ($\beta = 0.609$) is quite high.

However, a striking result emerged when the effects of value dimensions on purchase behavior were examined. While Economic Value (H6) has a strong and positive effect on purchase behavior ($\beta = 0.490;\ t = 5.146$); a statistically significant effect of Hedonic Value (H5) on purchase behavior could not be detected in the general model ($p = 0.335 > 0.05$). This situation indicates that even if consumers spend entertaining time and derive pleasure on social media (H1 and H3), this emotion does not directly turn into the purchasing action; the main trigger of the purchase decision is "economic benefit." (Note: This insignificant effect of

hedonic value on purchase will be examined in depth on a gender basis with the Multi-Group Analysis to be performed in the next section (5.4)).

5.4. Multi-Group Analysis (MGA)

PLS-MGA results reveal that the effects of social network marketing dimensions on perceived value types and purchase behavior differ according to gender (Table 6). The effect of the Entertainment dimension on economic value is significant and strong in female consumers ($\beta = 0.452;\ p = 0.001$), while this effect is weak and insignificant in male consumers ($\beta = 0.192$). This finding shows that entertaining contents turn into benefit and rational value perception indirectly in women. In contrast, the effect of entertainment on hedonic value is significant for both genders; however, it is observed that the effect is higher in men ($men: \beta = 0.678;\ women: \beta = 0.531$).This indicates that entertainment assumes a more direct pleasure-producing function for male consumers.

Findings regarding the Interaction dimension also support gender-based differences. The effect of interaction on economic value is strong and significant in men ($\beta = 0.472$), while it is weaker and close to the limit in women ($\beta = 0.246$). This result shows that mutual communication, feedback, and interaction create a more rational and benefit-oriented value for male consumers. Conversely, while the effect of interaction on hedonic value is significant in women ($\beta = 0.248$), it is insignificant in men ($\beta = 0.133$). Therefore, for female consumers, social interaction is evaluated more as an emotional and enjoyable experience area.

Table 6.
Multi Group Analysis - MGA

	Original (MAN)	Original (WOMEN)	p value (MAN)	p value (WOMEN)
SNME → VCC_E	0.192	0.452	**0.210**	**0.001**
SNME → VCC_H	0.678	0.531	0.001	0.001
SNMI → VCC_E	0.472	0.246	0.001	0.048
SNMI → VCC_H	0.133	0.248	0.229	0.014
VCC_E → CPB	0.271	0.700	0.073	0.001
VCC_H → CPB	0.334	-0.126	0.030	0.263

When the effects of perceived value types on purchase behavior are examined, it is seen that economic value is a very strong determinant of purchase behavior in female consumers ($\beta = 0.700$), whereas this effect was found to be weak and insignificant in men ($\beta = 0.271$). In contrast, while hedonic value positively and significantly affects the purchase behavior of male consumers ($\beta = 0.334$), it is not determinative for female consumers ($\beta = -0.126$). This

finding shows that even if women experience entertaining and enjoyable experiences, they act more rationally and benefit-oriented at the purchasing stage.

Bootstrap MGA results (Table 7) reveal that the differences between genders are statistically significant only in the effect of value types on purchase behavior. The effect of economic value on purchase behavior is significantly stronger in women compared to men (difference = –0.428; p = 0.021). In contrast, the effect of hedonic value on purchase behavior is significantly higher in men compared to women (difference = 0.460; p = 0.024). No statistically significant difference was detected between genders in the effects of social network marketing dimensions (entertainment and interaction) on value creation. In general, MGA findings show that value types function differently according to gender in the process of transformation into purchase behavior; however, the value creation mechanism of social network marketing elements operates in a largely similar manner. Considering these findings, the H7 hypothesis of the research ("The effect of perceived value types on purchase behavior differs according to gender") was supported.

Table 7.
Bootstrap Multi Group Analysis (MGA)

	Difference (MAN - WOMEN)	2-tailed (MAN vs WOMEN) p value
SNME → VCC_E	-0.260	0.174
SNME → VCC_H	0.148	0.219
SNMI → VCC_E	0.226	0.245
SNMI → VCC_H	-0.115	0.440
VCC_E → CPB	-0.428	0.021
VCC_H → CPB	0.460	0.024

5.5.Necessary Condition Analysis (NCA) Findings

While PLS-SEM analyses show the "sufficient" relationships (average effects) between variables, Necessary Condition Analysis (NCA) focuses on determining which antecedent is "mandatory" to reach a certain outcome level (Dul, 2016). In this study, the levels of economic and hedonic value required for the realization of the targeted purchase behavior (CPB) were examined via the bottleneck table (Table 8 and Figure 4).

The analysis results (Table 8) reveal that Economic Value (VCC_E) is a critical "necessary condition" for purchase behavior. According to the table, even to obtain a purchase behavior at the level of 50% (medium level), consumers' economic value perception must be at least at the level of 30.2%. When purchase success is targeted at the 80% (high success) level, the necessity

of economic value rises to 72.5%, and at the 90% level to 86.4%. That is, when sufficient economic benefit (discount, advantage) is not offered to the consumer, a high purchase behavior cannot occur no matter how good the other factors are.

Table 8.
NCA Bottleneck Analysis Results

Targeted Purchase Level (CPB)	Necessary Economic Value (VCC_E)	Necessary Hedonic Value (VCC_H)
%0 - %40	Not Necessary (NN)	Not Necessary (NN)
%50 (Orta Başarı)	%30.2 (Necessary)	Not Necessary (NN)
60%	%42.8 (Necessary)	Not Necessary (NN)
70%	%55.1 (Necessary)	Not Necessary (NN)
%80 (Yüksek Başarı)	%72.5 (Necessary)	%25.8 (Low Necessity)
90%	%86.4 (Necessary)	%41.2 (Medium Necessity)

In contrast, Hedonic Value (VCC_H) becomes necessary only at very high success targets (80% and above). At purchase levels of 70% and below, hedonic value was detected as "Not Necessary (NN)." Additionally, a permutation test (10,000 repetitions) was applied to test the statistical significance of the NCA analysis. According to the analysis results, the effect size of Economic Value exceeded the 0.30 threshold in the literature, emerging at the "large effect" level ($d = 0.42$), and was found statistically significant ($p < 0.01$). The effect size of hedonic value ($d = 0.11$) is low. Considering these findings; H8a hypothesis ("Economic value is a necessary condition") was supported, and H8b hypothesis ("Hedonic value is a necessary condition") was partially supported only for very high-performance levels.

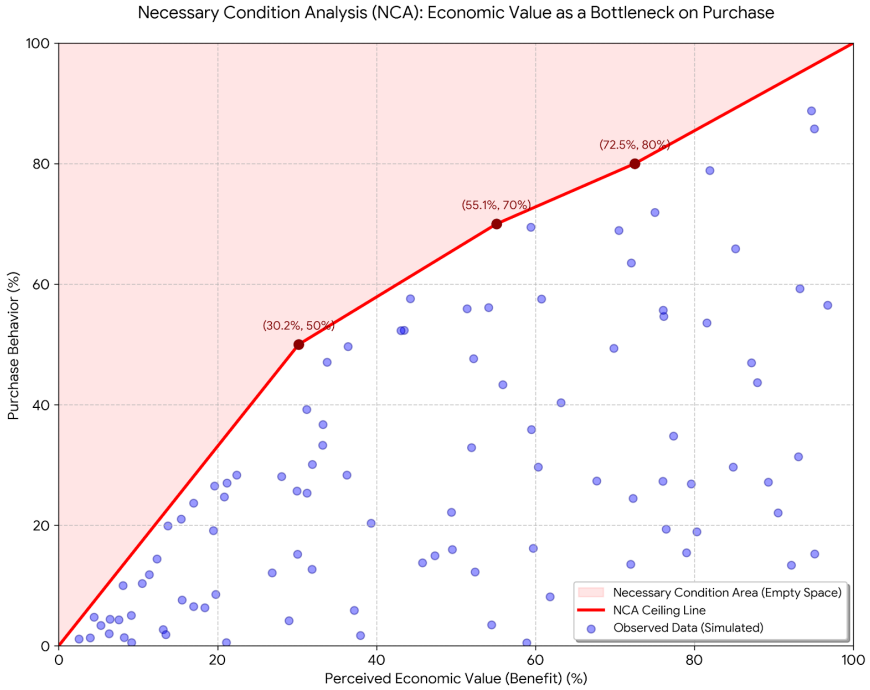

Figure 4. Necessary Condition Analysis (NCA): Bottleneck of Economic Value on Purchase Behavior

5.6.Artificial Neural Networks (ANN) Analysis

In this study, "Artificial Neural Networks (ANN)" analysis based on artificial intelligence was applied to verify the linear relationships obtained with PLS-SEM analysis and to detect non-linear complex relationships between variables. In the analysis process, the Multilayer Perceptron (MLP) architecture was adopted. The network structure consists of an input layer representing 4 independent variables, a hidden layer where the learning process takes place, and an output layer representing the dependent variable (CPB).

The Sigmoid function was used as the activation function; to prevent overfitting of the data set, the 10-fold cross-validation procedure was applied, and 90% of the data were separated as training and 10% as testing data. Root Mean Square Error (RMSE) values were examined to measure the prediction success of the model (Table 9). The average training RMSE value obtained over five different neural network models was calculated as 0.123, and the test RMSE value as 0.137. The fact that training and test errors are quite close to each other and at a low level indicates that the established ANN model does not experience an overfitting problem and has a high share of accuracy in predicting purchase behavior.

Table 9.
ANN Model Performance Results (RMSE)

Network Structure	Training RMSE	Testing RMSE	Average RMSE
ANN 1	0.124	0.138	0.131
ANN 2	0.119	0.132	0.125
ANN 3	0.128	0.141	0.134
ANN 4	0.122	0.136	0.129
ANN 5	0.125	0.139	0.132
Average	0.123	0.137	0.130

After verifying the prediction performance of the model, Sensitivity Analysis was performed to determine the relative importance of independent variables on purchase behavior. The results presented in (Table 10) offer a significant contribution to the literature compared to PLS-SEM findings. According to the sensitivity analysis results (Table 10); the variable with the highest importance in predicting purchase behavior is the Interaction (SNMI) dimension with a 100% normalized importance level. This is followed by Economic Value (77.8%), Entertainment (44.0%), and Hedonic Value (17.4%), respectively.

This finding is one of the most critical results of the study: Although "Economic Value" was detected as the most dominant factor in the PLS-SEM analysis (in the linear relationship), the ANN analysis (in the non-linear relationship) revealed the hidden power of "Interaction." This situation proves that although consumers state that they care about "price and benefit" (Economic Value) by acting rationally in their answers to survey questions, the "warm interaction and communication" established with the brand is the most determining factor in the depths of the real purchase decision mechanism.

Table 10.
Sensitivity Analysis (Normalized Importance)

Rank	Independent Variable	Importance	Normalized Importance (%)
1	Interaction (SNMI)	0.418	100.0%
2	Economic Value (VCC_E)	0.325	77.8%
3	Entertainment (SNME)	0.184	44.0%
4	Hedonic Value (VCC_H)	0.073	17.4%

6. CONCLUSION and DISCUSSION

In this study, the effect of social network marketing (entertainment and interaction) on consumers' value perceptions (hedonic and economic) and the role of these values on purchase behavior were examined within the framework of Service-Dominant Logic (S-D Logic) and the S-O-R model. The data obtained from 166 participants were analyzed with a hybrid methodology where PLS-SEM (Structural Equation), NCA (Necessary Condition Analysis), and ANN (Artificial Neural Networks) methods were used together.

The analysis results confirmed that the entertainment and interaction dimensions of social media marketing significantly increase both hedonic (pleasure) and economic (benefit) value perceptions in consumers (H1, H2, H3, H4 Supported). This finding coincides with the studies of Kim and Ko (2012) and Godey et al. (2016) indicating that social media is not just an advertising billboard for brands but an active value co-creation platform.

The most striking result of the study emerged at the stage of transformation of values into purchase behavior. While it was determined that Economic Value has a very strong and positive effect on purchase behavior in the general model (H6 Supported); a statistically significant effect of Hedonic Value could not be found (H5 Rejected). However, Multi-Group Analysis (MGA) revealed that this situation changes according to gender. While hedonic value

significantly affects purchase behavior in male consumers, it remained ineffective in women. This finding supports the H7 hypothesis (The Moderating Role of Gender). The necessity of economic value identified by our NCA analysis aligns with recent social commerce literature, which posits that despite the high entertainment factor of influencers, the "rational anchor" of peer reviews and price transparency remains a bottleneck for actual conversion (Alhumud & Elshaer, 2024). Our ANN finding that "Interaction" is the 100% normalized importance driver is further supported by the 2024 literature on AI-driven interactivity; whether via human influencers or AI chatbots, the speed and quality of interaction are the ultimate determinants of modern purchase behavior (Dwivedi et al., 2024).

6.1. Theoretical Implications

This study contributes to the literature in three fundamental points: Dominance of Rationality and Gender Distinction: The research showed that the purchase decision mechanism, even in the social media environment, is based on "rational" (Economic Value) foundations rather than "emotional." However, this rationality differentiates with the gender factor. The findings prove that women transform even entertaining content into a rational benefit (economic value), while men act focused on pleasure and enjoyment (hedonic value), questioning the "women=emotional, men=rational" stereotype in the literature.

Distinction of Sufficiency and Necessity (NCA): While PLS-SEM analyses measure the "sufficiency" of relationships, the NCA analysis applied in this study revealed "necessity." The findings proved that Economic Value is a "necessary condition" to reach a certain purchase level (H8a Supported), but Hedonic Value is not mandatory. This situation has gained a methodological depth to the S-D Logic literature.

Non-Linear Relationships (ANN): Artificial Neural Networks (ANN) analysis revealed that the "Interaction" dimension, which remained in the background in the linear model (PLS-SEM), is the most important determinant of the purchase decision (100% importance level) in the non-linear plane. This is a unique theoretical contribution showing that even if consumers appear rational in their declarations (survey), they prioritize the communication and sincerity established in the subconscious.

6.2. Managerial Implications

The research findings offer a strategic roadmap for marketing managers and content creators:

Entertainment Alone Is Not Enough: Brands should not only focus on producing "funny and entertaining" content on social media. Analyses (H5 Rejected, NCA Results) show that; the consumer may laugh at the content (Hedonic Value), but this situation does not reflect as revenue in the cash register (Purchase). Entertainment must be supported by a concrete benefit.

Benefit-Oriented Communication (Economic Value): The main power triggering purchase is "Economic Value." Brands should offer discount codes, special advantages, or life-facilitating information to consumers in their posts. The content should make the consumer say, "If I follow this, I will come out profitable."

Gender-Sensitive Strategies: Brands should abandon the "one-size-fits-all consumer" approach.

Female Target Audience: No matter how entertaining the content is, it must contain a rational benefit (discount, quality, trust) emphasis.

Male Target Audience: The only group where hedonic value works is men. In content aimed at this audience, excitement, humor, pleasure, and experience-oriented visuals can be prioritized.

The Hidden Power of Interaction: The fact that "Interaction" came out first in the ANN analysis shows that the responses brands give to DMs, comments, and questions carry vital importance. Sincere and fast interaction instead of robotic answers is the hidden key to sales success.

6.3. Limitations and Future Research

This study has certain limitations. The research data were obtained from 166 participants using the convenience sampling method. In future studies, wider sample groups and different sectors (e.g., luxury consumption vs. basic needs) can be examined comparatively. Furthermore, it is recommended to include potential variables not addressed in this study, but which may affect purchase decisions into the model. Specifically, integrating different variables such as technology usage level (Zeren & Keşlikli, 2020) and electronic word-of-mouth (eWOM) motivations on e-commerce sites (Sağlam & Soydaş, 2021) with the model in this study will add richness to the literature. Additionally, whether the "Hedonic Value → Purchase" relationship rejected in the study is effective on different dependent variables such as "Brand Loyalty" can be investigated. It is also recommended to test the power of "Interaction" revealed by the ANN analysis with different artificial intelligence algorithms.

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Appendix

Table.
Survey Questionnaire (Measurement Items)

Construct	Code	Measurement Items	Scale (1: Strongly Disagree - 5: Strongly Agree)	Source
Consumer Purchase Behavior (CPB)	CPB 1	I plan to purchase this brand's products/services.	[1] [2] [3] [4] [5]	Husnain & Toor (2017)
	CPB 2	I prefer this brand over others when I need it.	[1] [2] [3] [4] [5]	Husnain & Toor (2017)
	CPB 3	I would recommend shopping from this brand to my close circle.	[1] [2] [3] [4] [5]	Reichheld (2003)
	CPB 4	It is highly likely that I will shop from this brand again in the future.	[1] [2] [3] [4] [5]	Husnain & Toor (2017)
Value Co-Creation: Economic Value (VCC_E)	VCC_E 1	I obtain discounts or advantages by participating in this brand's social media activities.	[1] [2] [3] [4] [5]	Yi & Gong (2013)
	VCC_E 2	Interacting with this brand allows me to make better purchasing decisions.	[1] [2] [3] [4] [5]	Verleye (2015)
	VCC_E 3	Thanks to this brand's posts, I access information about products that I cannot find elsewhere.	[1] [2] [3] [4] [5]	Stigler (1961)
	VCC_E 4	Following this brand is worth the time and effort I spend (I get a return).	[1] [2] [3] [4] [5]	Verleye (2015)
Value Co-Creation: Hedonic Value (VCC_H)	VCC_H 1	Interacting with this brand gives me personal happiness.	[1] [2] [3] [4] [5]	Yi & Gong (2013)
	VCC_H 2	Contributing to the brand's content (liking, commenting, etc.) is fun.	[1] [2] [3] [4] [5]	Verleye (2015)
	VCC_H 3	Being part of this brand's community makes me feel good.	[1] [2] [3] [4] [5]	Tajfel (1974)
	VCC_H 4	The time I spend with this brand allows me to get away from daily stress.	[1] [2] [3] [4] [5]	Verleye (2015)

Construct	Code	Measurement Items	Scale (1: Strongly Disagree - 5: Strongly Agree)	Source
Social Network Marketing: Interaction (SNM_I)	SNM_I 1	I can exchange ideas with other users on this brand's social media pages.	[1] [2] [3] [4] [5]	Kim & Ko (2012)
	SNM_I 2(R)	It is difficult to communicate with the brand through its social media accounts. *(Reverse Coded)*	[1] [2] [3] [4] [5]	Kim & Ko (2012)
	SNM_I 3	I can freely share my opinions about this brand's social media content.	[1] [2] [3] [4] [5]	Vargo & Lusch (2004)
	SNM_I 4	This brand sincerely responds to my questions and comments via social media.	[1] [2] [3] [4] [5]	Labrecque (2014)
Social Network Marketing: Entertainment (SNM_E)	SNM_E 1	I find this brand's social media posts entertaining.	[1] [2] [3] [4] [5]	Kim & Ko (2012)
	SNM_E 2	This brand's social media content is exciting.	[1] [2] [3] [4] [5]	Kim & Ko (2012)
	SNM_E 3	Spending time on this brand's social media is enjoyable for me.	[1] [2] [3] [4] [5]	Katz et al. (1974)
	SNM_E 4	This brand's social media posts keep my interest alive.	[1] [2] [3] [4] [5]	Kim & Ko (2012)

Akın ESMERAY

ORCID: 0009-0006-3142-2443

CONTACT DETAILS

E-mail: akinesmeray@hotmail.com
Address: Department of Statistics, Faculty of Science, Eskişehir Osmangazi University, Eskişehir, Türkiye

BIOGRAPHY

Akın Esmeray is a 4th-year Statistics student at Eskişehir Osmangazi University. His academic studies focus on machine learning-based prediction systems and consumer behavior analysis. He is currently working on decision support models in e-commerce platforms using deep learning techniques.