

Sustainable Consumption and Digital Media in Türkiye: Mediating Role of Ecological Literacy



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Abstract

This study aims to fill a significant gap in the literature by examining the mediating role of ecological literacy knowledge (ELK) in the relationship between digital media use (DMU) and sustainable consumption behavior (SCB). Within the scope of the research, 435 valid survey data obtained from individuals aged 18 and over across Türkiye were analyzed. During the data analysis process, the proposed model was tested using Partial Least Squares – Structural Equation Modeling (PLS-SEM). The findings revealed that DMU does not have a direct effect on SCB, but it significantly influences SCB through ELK. This result indicates that ELK plays a mediating role in the relationship between DMU and SCB. The positive outcomes of DMU in terms of sustainability can be achieved by increasing individuals' levels of ELK. Accordingly, sustainability policies need to be redesigned to consider the dynamics of digital environments and individuals' levels of environmental knowledge.

Keywords: Sustainability, Sustainable Consumption Behavior, Ecological Literacy, Digital Media Use.

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Türkiye'de Sürdürülebilir Tüketim ve Dijital Medya: Ekolojik Okuryazarlığın Aracı Rolü



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Öz

Bu çalışma, dijital medya kullanımı (DMK) ve sürdürülebilir tüketim davranışı (STD) arasındaki ilişkide ekolojik okuryazarlık bilgisinin (EOB) aracı rolünü inceleyerek literatürdeki önemli bir boşluğu doldurmayı amaçlamaktadır. Araştırma kapsamında, Türkiye genelinde 18 yaş ve üzeri bireylerden elde edilen 435 geçerli anket verisi analiz edilmiştir. Veri analizi sürecinde, önerilen model Kısmi En Küçük Kareler – Yapısal Denklem Modellemesi (PLS-SEM) kullanılarak test edilmiştir. Bulgular, DMK'nın STD üzerinde doğrudan bir etkisinin olmadığını, ancak EOB aracılığıyla bu ilişkiyi önemli ölçüde etkilediğini ortaya koymuştur. Bu sonuç, EOB'nin DMK ve STD arasındaki ilişkide aracı bir rol oynadığını göstermektedir. Sürdürülebilirlik açısından DMK'nın olumlu sonuçları, bireylerin EOB düzeylerinin artırılmasıyla elde edilebilir. Buna göre, sürdürülebilirlik politikalarının dijital ortamların dinamiklerini ve bireylerin çevresel bilgi düzeylerini dikkate alacak şekilde yeniden tasarlanması gerekmektedir.

Anahtar Kelimeler: Sürdürülebilirlik, Sürdürülebilir Tüketim Davranışı, Ekolojik Okuryazarlık, Dijital Medya Kullanımı.

Introduction

With the acceleration of digitalization in the 21st century, individuals are adopting consumption behaviors from online platforms; access to information is becoming easier through digital media. However, empirical studies revealing the mediation role of ecological literacy knowledge (ELK) in this process are limited (Hu & Meng, 2023). This situation necessitates that ELK be addressed in the digital context and studied systematically in the literature. In this context, the relationship between individuals' ELK level and sustainable consumption behavior (SCB) has become increasingly vital. ELK encompasses an individual's ability to understand environmental systems, evaluate this information, and make environmentally compatible consumption decisions (McBride, Brewer, Berkowitz, & Borrie, 2013). However, the impact of environmental information found on digital platforms on this has not been sufficiently studied.

In particular, Hu and Meng (2023) conducted an empirical study examining the effect of digital literacy on green consumption behavior, demonstrating its impact through cognitive and emotional mediators, including self-efficacy, expectations, pride, and guilt. While this study provides critical findings, there is a lack of detailed modeling on how ecological literacy is acquired in the digital media environment and the processes by which this acquisition leads to behavior. In a similar vein, Liu, Wang, and Han (2024) investigated the impact of digital literacy on green production behavior within the agricultural sector, proposing ecological cognition as a mediation variable. While this example is significant, there is a lack of research on similar interactions in the digital shopping processes of urban users.

A study conducted by Xie and Madni (2023) on Chinese youth found that social media has a positive influence on green purchase intentions through subjective norms and perceived green value, and that occupation serves as a moderating variable in the effect of subjective norms. However, the study did not measure ecological literacy or individuals' levels of environmental awareness. Fully assessing the effects of social media on sustainable consumption behaviors faces certain constraints.

The rapid growth in the internet and social media use today has led to the widespread adoption of digital interaction on a global scale. As of July 2023, the number of internet users worldwide has reached 5.19 billion, accounting for 64.5% of the global population. Similarly, the number of active social media users has reached 4.88 billion, accounting for 60.6% of the world's population ("Digital 2023 July Global Statshot Report," 2023). This increase suggests that social media platforms are not limited to socializing, but also play a significant role in accessing information and consuming news. Indeed, the fact that 41% of users prefer Facebook, 30% prefer YouTube, and lower percentages prefer WhatsApp, Instagram, and Twitter as news sources highlights the impact of digital media environments on the circulation of social information (Newman, Fletcher, Eddy, Robertson, & Nielsen, 2023). Therefore, these data reveal the extent to which digitalization has reached on a global scale and show that consumption processes shaped through digital media are playing an increasingly decisive role in individuals' daily life practices.

In the digital age, ELK provides a critical theoretical framework for the development of SCB. However, a review of the current literature indicates that empirical research on the acquisition of ELK in digital settings is scarce. In particular, there is a clear gap in the literature regarding how individuals develop this literacy in their digital media use (DMU) processes and how this is reflected in SCB. Existing studies primarily focus on the agriculture or education sectors and do not provide comprehensive analyses of the consumption activities of urban individuals in digital environments (Xie & Madni, 2023; Chen, Chen, and Tung, 2018; Zhou, Dai, & Zhang, 2007). This research fills an important literature gap by analyzing the developmental process of ELK within the framework of DMU and evaluating the transition of this knowledge into SCB.

This study aims to determine the impact of digital media use on sustainable consumption in Türkiye and the mediating role of ecological literacy in this process. Focusing on the bridging function between digital transformation and environmental responsibility, the research is important in filling the conceptual gap in the literature. Using a quantitative research design, data were collected between November 9, 2024, and May 2, 2025, from participants aged 18 and over living in Türkiye who regularly use digital media, via convenience sampling and an online survey. The analysis process, conducted on a total of 435 valid data points, utilized SmartPLS 4 software. Within the scope of Structural Equation Modeling (SEM), validity and reliability were tested using Cronbach's Alpha, CR, and AVE values; and after checking for multicollinearity using VIF values, the model was tested.

1. Literature

1.1. Digital Media Use

Today, digital consumers not only shop online but also research products, access reviews, and interact directly with manufacturers through computers and mobile devices. This transformation reshapes the relationship between manufacturers and consumers (Fiore, 2008) while also promoting environmental sustainability. By accelerating the flow of information in the agricultural sector, these technologies facilitate the adoption of environmentally friendly practices and contribute to the widespread adoption of sustainable production methods. Furthermore, producers who communicate directly with consumers via digital platforms help to socialize environmental awareness by increasing demand for green products (Wang, Tong, Xia, Shi, & Cai, 2024). Therefore, the internet functions not only as a shopping channel but also as an effective means of distribution and communication. This multifaceted structure enables various online interactions between organizations and customers. These interactions encompass a wide range of digital activities, such as information search, online banking transactions, product purchases, participation in social media platforms, and interaction with online communities (Rose, Hair, & Clark, 2011)

Chen, Gillenson, and Sherrell (2002) state that technological infrastructure, low cost, and social interaction-focused strategies make digital consumption more attractive. This transformation shifts media usage towards a sustainability focus, while the diversity of information in the digital environment has become a key determinant of Ecological Literacy levels and environmental awareness.

The three-stage digitalization process (technological integration, platform interaction, and optimized decision-making) defined by (Katz, 2015) provides businesses with agility through tools such as artificial intelligence and big data. With this transformation, digital shopping offers a more advantageous experience compared to physical stores due to its variety, personalization, and access to information; it is particularly preferred for its convenience and time efficiency.

A study by Keeney (1999) revealed that the majority of core values associated with digital shopping are utilitarian values. Other researchers also agree that the reasons for preferring digital shopping are primarily based on utilitarian values (To, Liao, & Lin, 2007). Therefore, the emotions experienced by consumers during online shopping directly influence their shopping behavior (Zhou et al. 2007). Consumers' online shopping preferences are primarily based on practicality, accessibility, and price advantages. Factors such as product variety, reliability, and privacy are considered critical, while elements like free shipping, avoiding sales representatives, and entertainment are less important. This situation demonstrates that online shopping is primarily preferred for its functionality and time savings (Lester, Forman, & Loyd, 2006).

1.2. Ecological Literacy and Sustainable Consumption

Ecological literacy is a multidimensional construct that integrates cognitive, emotional, and behavioral dimensions to foster a conscious relationship with natural processes (Jordan, Singer, Vaughan, & Berkowitz, 2009). This concept requires education that fosters both knowledge and ecological awareness, with ELK serving as a transformative tool supporting sustainability at individual, institutional, and societal levels (Orr, 1992, p. 87).

Menzies, Bowles, McGregor, Ford, and Popp (2024) define ecological literacy as a learning process and way of life that develops through sensory and participatory interactions with nature, based on lived experience rather than theory. While this concept encompasses transforming environmental knowledge into daily life and concrete behaviors, Charles (1996) emphasizes that ecological literacy goes beyond individual knowledge and carries a civic awareness dimension that generates social responsibility and inclusive solutions.

Capra (2007) argues that ecological literacy in building sustainable communities should be based on learning from the experiences of past societies and integrating the workings of nature into social institutions. In this context, ELK emphasizes the inclusion of systematic knowledge produced through scientific methods into conscious decision-making processes, rather than viewing the environment merely as a problem to be solved (McBride et al., 2013). Therefore, ecologically literate individuals are those who understand environmental systems and translate this knowledge into responsible actions (Ndulor, Chukwuma, & Mbalisi, 2019). This cognitive competence forms the basis for individuals to adopt sustainable approaches in their daily practices, and especially in their consumption behaviors.

Sustainable consumption aims to protect the living standards of future generations while offering a solution to the problem of the current economic system rapidly depleting natural resources (Hansen & Schrader, 1997). This approach requires a collective responsibility aimed at minimizing the effects of

overproduction, promoting social equality, and conserving natural resources (Jillani, Chaudhry, Jafri, & Zahid, 2025). Understanding sustainable consumer behavior is directly related to promoting environmental responsibility in consumers (Horrich, Ertz, & Bekir, 2025). In this context, consumers exhibit conscious choices such as checking labels, preferring biodegradable and recycled products, or supporting environmental organizations (Chen, Lin, & Weng, 2015). Actions such as avoiding aerosol sprays, turning to local and organic products, supporting fair trade products, and reducing plastic use are concrete manifestations of this responsibility (Gilg, Barr, & Ford, 2005). These behaviors play a critical role in developing environmental awareness and internalizing a sustainable lifestyle in individuals.

1.3. Evaluation of Digital Media Use in the Context of Ecological Literacy from a Sustainable Consumption Perspective

To mitigate the negative impacts of climate change, increasing societal participation and environmental awareness is critical to achieving sustainability goals (Liao, 2024). In this process, consumption has ceased to be merely a means of survival and has become an expression of holistic conformity reflecting individuals' social values and prestige. Consumer education, therefore, comes into play at this point, empowering individuals with the ability to make informed decisions; it directly contributes to reducing household waste by promoting a sense of saving and encouraging the preference for low-waste and recyclable products (Hayta, 2009).

Information and values disseminated globally through the media have a significant impact on the sustainability determinants. The media influences consumers' perceptions of transportation modes, particularly desired vehicles, as well as desired lifestyles (Fuchs & Lorek, 2001, p. 40). In this context, it is evident that numerous variables influence consumers' adoption of online shopping.

Multidimensional factors such as demographic characteristics, motivations, and psychological perceptions that shape online consumer behavior play a direct and decisive role in the competitiveness and long-term sustainability of businesses in the market (Zhou et al. 2007).

In this context, digital innovations, emerging with new combinations of digital and physical components, are triggering radical transformations in business models and products by overcoming traditional market barriers (Bican & Brem, 2020). This strategic transformation has necessitated an ethical approach to managing information and cultural content by integrating the social impacts of digital technologies into business practices. This process, defined as digital sustainability, aims to produce and reuse digital representations such as software, visual, and auditory content in a way that maximizes the benefit to society (Dapp, 2013). Therefore, as consumer awareness grows, progress toward sustainable consumption goals becomes more attainable (Chamcham, Pakravan-Charvadeh, Maleknia, & Flora, 2024).

2. Theoretical Model Design and Hypothesis Development

The research presents a conceptual model designed to examine the key factors influencing individuals' sustainable consumption behaviors within the context of

digital media use, taking into account their ecological literacy knowledge. ELK, which lies at the core of the model, represents individuals' level of environmental knowledge, awareness, and the conscious consumption attitudes they develop accordingly. With increased access to information in digital environments, the guiding effect of ecological literacy on SCBs has become even more pronounced. In this context, the structures included in the proposed model and the hypotheses explaining the causal relationships between these structures discuss how ecological literacy becomes functional in digital media use processes and how it shapes sustainability-focused decisions.

The hypotheses developed within the scope of the research model are presented below.

H1. Digital media use affects sustainable consumption behavior.

H2. Digital media use affects ecological literacy knowledge.

H3. Ecological literacy knowledge affects sustainable consumption behavior.

H4. Ecological literacy knowledge mediates the relationship between digital media use and sustainable consumption behavior.

Table 1 provides a comparative overview of previous empirical studies examining the relationships between ecological literacy knowledge, digital media/consumption use, and sustainable consumption behavior. It summarizes the sample groups and research contexts used, the methods and analysis techniques employed, the variables considered, and the key findings.

Table 1. Comparative Overview of Empirical Studies on Ecological Literacy Knowledge, Digital Consumption, and Sustainable Consumption Behavior and Associated Hypotheses

Study (Year)	Sample / Context	Core Model / Method	Examined Variables / Prerequisites	Relevance to the Current Study / Model Variables	Related Hypothesis (es)
Chen et al. (2015)	477 participants, Taiwan	Structural Equation Modeling (SEM)	Green perception, eco-friendly knowledge	Ecological Literacy Knowledge, Sustainable Consumption	H3
Liu et al. (2024)	884 participants, Liaoning Province, China	Propensity Score Matching (PSM), Mediation model	Digital learning/social/processing literacy, ecological cognition	Digital Media Use, Ecological Literacy Knowledge, Sustainable Consumption	H1, H2, H3, H4

Chen et al. (2018)	227 participants , B&RI countries (Vietnam, China, Philippines, Pakistan, etc.)	PLS-based Structural Equation Modeling (PLS-SEM)	Environmental attitude, product attitude, social influence, perceived monetary value	Ecological Literacy Knowledge, Sustainable Consumption	H3
Karaca and Karapınar (2021)	301 participants , Türkiye	Structural Equation Modeling (SEM), Confirmatory Factor Analysis (CFA)	Environmental literacy, green product attitude, green purchase intention	Ecological Literacy Knowledge, Sustainable Consumption	H3
Bican and Brem (2020)	8 high-tech firms, Germany	Conceptual model, qualitative data (interviews)	Digital transformation, digital business models, sustainable innovation	Digital Media Use, Sustainability	H1
Hu and Meng (2023)	588 participants , China	Structural Equation Modeling (SEM) (SmartPLS 3.3.3)	Digital literacy, self-efficacy, outcome expectation, anticipated pride and guilt	Ecological Literacy Knowledge, Sustainable Consumption	H1,H2, H4
Joshi and Rahman (2017)	750 participants , Delhi	Structural Equation Modeling (SEM)	Key indicators of sustainable purchase behaviors	Ecological Literacy Knowledge, Sustainable Consumption	H3
Childers, Carr, Peck, and Carson (2001)	274 university students, Midwest US (Study 1); actual online shoppers (Study 2)	Structural Equation Modeling (SEM) Lisrel 8	Online shopping motivations (hedonic and utilitarian), ease of use, navigation, and product evaluation	Digital Media Use	H1, H2
Abd-Rahman, Halim and Syed-Abdullah (2025)	356 participants , Malaysia	Structural Equation Modeling (SEM)	Individual values, social norms, and perceived well-being	Ecological Literacy Knowledge, Sustainable Consumption	H3
Straughan and Roberts (1999)	235 participants , USA	Multiple Regression Analysis and Stepwise Regression	Environmental values, personal responsibility, ecological attitudes, perceived consumer effectiveness	Ecological Literacy Knowledge, Sustainable Consumption	H3, H4
Teng, Xiao,	1,673 participants	Linear regression +	Internet use, environmental	Sustainable Consumption	H4

Zhang, and Yang (2025)	, China	classic mediation test (Baron & Kenny, Wen & Ye)	concern		
Chamcham et al. (2024)	432 consumers, Iran	PLS-based Structural Equation Modeling (PLS-SEM)	Dimensions of media literacy (interactive platforms, expert-led programs)	Ecological Literacy Knowledge, Sustainable Consumption	H3
Hamed Mussa (2023)	384 higher education students, Egypt	Regression and Correlation analysis, Mediation test	Social media use, climate change awareness (as a mediator)	Sustainable Consumption	H4

Figure 1 illustrates the proposed research model, showing the relationships between DMU, ELK, and SCB, as well as the mediating role of ELK.

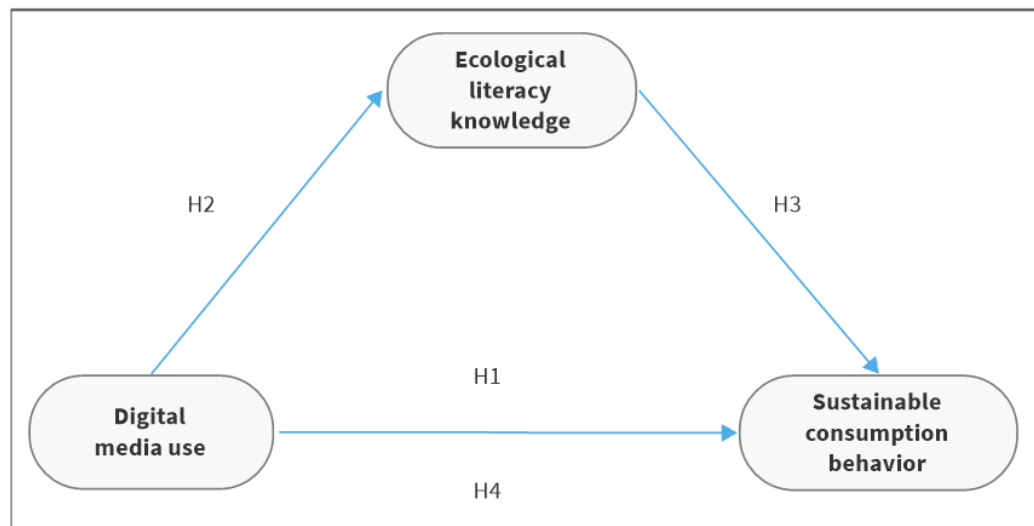


Figure 1. Research Model

3. Method

3.1. Measurements

In this study, a total of 31 items adapted from scales available in the literature were used to measure the variables of Ecological Literacy Knowledge, Digital Media Use and Sustainable Consumption Behavior. All measurement items were reviewed in accordance with expert evaluations to ensure content validity. The Ecological Literacy Knowledge Scale consists of 10 items. The first five items were adapted from the objective knowledge scale developed by Chen et al. (2018), while the remaining five items were adapted from the perceived knowledge items concerning environmental sustainability issues developed by Joshi and Rahman (2017). The items adapted from different sources were modeled under a single latent variable in accordance with the theoretical model of the study. The Digital Media Use (DMU) Scale consists of 10 items and was adapted

from Childers et al. (2001)'s seminal work on online retail shopping motivations. Although the original scale was designed to measure hedonic and utilitarian motivations within digital shopping environments, these indicators were conceptualized and modeled under a single latent variable in this study to comprehensively assess the extent to which individuals utilize digital media platforms during their contemporary consumption processes. The Sustainable Consumption Behavior Scale consists of 11 items. The first four items were adapted from the sustainable shopping behavior items developed by Joshi and Rahman (2017), while the remaining seven items were adapted from the scale developed by Straughan and Roberts (1999). The items obtained from different sources were modeled as a unidimensional construct in accordance with the purpose and theoretical model of the study. The reliability and validity of the measurement models were assessed using factor loadings, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), and discriminant validity (HTMT) criteria. The necessary permissions for the use of the scales were obtained from the relevant authors and/or copyright holders or platforms managing the relevant rights. The final section of the questionnaire included questions designed to determine participants' digital media and online shopping usage habits, as well as their sociodemographic characteristics.

3.2. Sample and Data Collection

Participants were selected using convenience sampling, which is a non-probability sampling method. The inclusion criteria for participation in the study were that participants resided in Türkiye, were aged 18 years or older, used digital media platforms extensively, and had any level of education. These criteria were established to encompass a broad range of participants and to increase the generalizability of the research findings. Data were collected using an online questionnaire form. The questionnaire was developed using a five-point Likert scale (1 = Strongly Agree, 5 = Strongly Disagree). The survey was conducted between November 9, 2024, and May 2, 2025. A total of 440 responses were collected for the analysis, of which 435 were considered valid. The collected data were subsequently subjected to validity and reliability analyses.

3.3. Data Analysis Method

Within the scope of the research, SPSS 24 and SmartPLS 4 software were used to analyze the data obtained from the survey administered to the participants. Descriptive statistics of the participants were analyzed in SPSS. In SmartPLS, the scales used were first subjected to reliability and validity analysis. Then, relationship analyses (hypothesis tests) were performed.

3.4. Participants' Demographics

In terms of demographics, the sample consisted predominantly of young, married, and highly educated women from middle and upper income brackets. This overrepresentation of a specific socio-demographic group is considered a limitation of the study, as it may lead to sampling bias. Therefore, the findings cannot be fully generalized to a broader population. Future studies should aim to include more diverse and representative samples to improve external validity.

Table 2 presents the demographic characteristics of the participants, including gender, marital status, age, education, income, and occupation.

Table 2. Participant Demographics

Variable	Sub-category	Frequency (N)	Percentage (%)
Gender	Female	335	77.01
	Male	100	22.99
Marital status	Married	309	71.03
	Single	126	28.97
Age group	18–24	34	7.82
	25–34	201	46.21
	35–44	136	31.26
	45–54	46	10.57
	55–64	16	3.68
	65 and over	2	0.46
Education level	High school	50	11.49
	Associate degree	65	14.94
	Bachelor's degree	211	48.51
	Master's degree	62	14.25
	PhD	42	9.66
	Primary education	5	1.15
Monthly income level	≤ 22,104 TL	52	11.95
	22,105 – 30,000 TL	27	6.21
	30,001 – 40,000 TL	39	8.97
	40,001 – 50,000 TL	76	17.47
	≥ 50,001 TL	180	41.38
	Not specified/Other	61	14.02
Occupation	Housewife	94	21.61
	Teacher	68	15.63
	Student	40	9.20
	Engineer	26	5.98
	Jobseeker	25	5.75
	Nurse	22	5.06
	Academic	21	4.83
	Police officer	17	3.91
	Accountant	16	3.68
	Retired	11	2.53
	Digital media specialist	10	2.30
	Doctor	7	1.61
	Lawyer	5	1.15
	Other	73	16.76
Total participants		435	100

4. Findings

4.1. Reliability and Validity Test

All measurement items used in this study are presented in Table 3. The reliability and validity of the measurement model were evaluated using PLS-SEM. Factor loadings, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) values were examined to test internal consistency and construct validity. The findings indicate that the internal consistency of the structures is high and that the measurement variables adequately represent their respective structures. Item 4 of the ELK scale was excluded from the scale because it had a factor loading below the recommended

threshold value. The Cronbach's Alpha coefficients of the variables ranged from 0.906 to 0.961; composite reliability (rho_a and rho_c) coefficients ranged from 0.906 to 0.962. These values indicate high internal consistency, reliability and reliable measurement across structures. When examining the factor loadings, it is evident that the majority of loadings for each structure ranged between 0.729 and 0.898; however, a few variables were below 0.70. According to Hair et al. (2014), factor loadings ≥ 0.708 are recommended.

Furthermore, items falling between 0.40 and 0.70 should be removed from the model if they do not increase the AVE (Average Variance Extracted) or CR (Composite Reliability) values. The ELK4 item belonging to the ecological literacy knowledge variable was removed from the model because its factor loading remained below the recommended threshold of 0.70. After the analysis was repeated, the ELK2 (0.474) and ELK5 (0.501) items also remained below the threshold value. However, since the AVE value for this structure was 0.524, which is above the minimum accepted value of 0.50, convergent validity was considered to be established (Hair et al., 2022).

Table 3. Measurement model results

Variable	Code	Item	Factor loading	Cronbach's alpha	CR (rho_c)	AVE
Digital media use	DMU1	Using digital media will increase my shopping efficiency.	0.729	0.913	0.912	0.514
	DMU2	Using digital media will be useful in purchasing the product I want.	0.549			
	DMU3	Using digital media will be clear and understandable.	0.819			
	DMU4	Using digital media does not require much mental effort.	0.596			
	DMU5	Using digital media will help me save time while shopping.	0.686			
	DMU6	Using digital media will make shopping less time-consuming.	0.719			
	DMU7	Using digital media will provide flexibility in accessing information.	0.619			
	DMU8	Using digital media will allow	0.778			

Variable	Code	Item	Factor loading	Cronbach's alpha	CR (rho _c)	AVE
		me to discover eco-friendly products.				
	DMU9	Using digital media will provide information similar to a close personal inspection of a product.	0.774			
	DMU10	Using digital media will allow me to accurately evaluate the quality of products.	0.838			
Ecological literacy knowledge	ELK1	I know whether a product is a green product or not.	0.760	0.906	0.906	0.524
	ELK2	I know that non-green products harm the environment.	0.474			
	ELK3	I know what an environmental (eco) label is.	0.706			
	ELK5	I know that using green products reduces harm to the environment.	0.501			
	ELK6	I know that I purchase ecologically safe products.	0.835			
	ELK7	I have more information about recycling than the average person.	0.689			
	ELK8	I know where to find products that create less waste.	0.849			
	ELK9	I have knowledge regarding sustainability symbols used on product packaging.	0.794			
	ELK10	I am very knowledgeable about environmental and social issues.	0.800			
Sustainable consumption	SCB1	When shopping, I consciously check	0.889	0.961	0.961	0.690

Variable	Code	Item	Factor loading	Cronbach's alpha	CR (rho _c)	AVE
behavior		products for environmentally harmful ingredients.				
	SCB2	When shopping, I consciously prefer products with eco-friendly packaging.	0.898			
	SCB3	I prefer sustainable products even if they are more expensive than others.	0.821			
	SCB4	I consider environmental and fair-trade labels when purchasing products.	0.823			
	SCB5	I change/switch products that are not suitable for ecological conditions.	0.823			
	SCB6	I warn my family members or friends not to buy products that harm the environment.	0.767			
	SCB7	I purchase products that cause less pollution.	0.860			
	SCB8	I buy products with recyclable packaging whenever possible.	0.837			
	SCB9	I do not buy products sold by companies that do not have ecological responsibility.	0.817			
	SCB10	I take care to buy only recycled products.	0.830			
	SCB11	When I buy a product, I try to consider how its usage affects the	0.760			

Variable	Code	Item	Factor loading	Cronbach's alpha	CR (rho _c)	AVE
		environment and other consumers.				

Similarly, in the DMU structure, although the factor loadings of some items, such as DMU2 (0.549), DMU4 (0.596), and DMU7 (0.619), remained below 0.70, the AVE value for this structure was 0.514, and the CR value was calculated as 0.912. Since these values exceed the relevant thresholds ($AVE \geq 0.50$; $CR \geq 0.70$), it is appropriate to retain these items in the model (Hair et al., 2022). All factor loadings for the SCB structure are above 0.70 (e.g., SCB2: 0.898; SCB7: 0.860), and the structure's AVE value is relatively high at 0.690; this indicates that the structure has both strong internal consistency and convergent validity. In conclusion, considering that the AVE values for all structures ranged between 0.514 and 0.690 and the CR values were above the recommended limits, it can be stated that the model provides adequate validity and reliability overall (Hair et al., 2022).

Table 4 presents the analysis results according to the Fornell-Larcker (1981) criterion. Discriminant validity among the structures in the model was first evaluated according to the Fornell-Larcker criterion, which states that the square root of a structure's AVE value should be higher than its correlations with other structures. While this condition is met in the DMU and SCB structures, the correlation between ELK and SCB (0.829) is higher than the square root of the AVE value (0.724) for this structure. Therefore, the discriminant validity between these two structures is limited according to the Fornell-Larcker criterion. However, the Heterotrait-Monotrait (HTMT) ratio, which has gained wider acceptance in the literature in recent years and is said to measure discriminant validity more accurately in variance-based structural equation modeling, was also evaluated. Henseler, Ringle, and Sarstedt (2015) stated that discriminant validity is ensured when the HTMT ratio is below 0.85 and emphasized that HTMT is a more reliable criterion compared to Fornell-Larcker's.

Table 4. Discriminant Validity Results (Fornell-Larcker Criterion)

	Digital media use	Ecological literacy knowledge	Sustainable consumption behavior
Digital media use	0.717		
Ecological literacy knowledge	0.551	0.724	
Sustainable consumption behavior	0.512	0.829	0.831

The diagonal entries in Table 4 show the square roots of AVE.

Table 5. HTMT Ratios

	Digital media use	Ecological literacy knowledge
Ecological literacy knowledge	0.549	
Sustainable consumption behavior	0.507	0.816

As seen in Table 5, all HTMT ratios are below the threshold of 0.85. This indicates that discriminant validity between the constructs in the model is established according to the HTMT criteria.

4.2. Structural Equation Model

Figure 2 illustrates the structural equation model developed to test the research hypotheses.

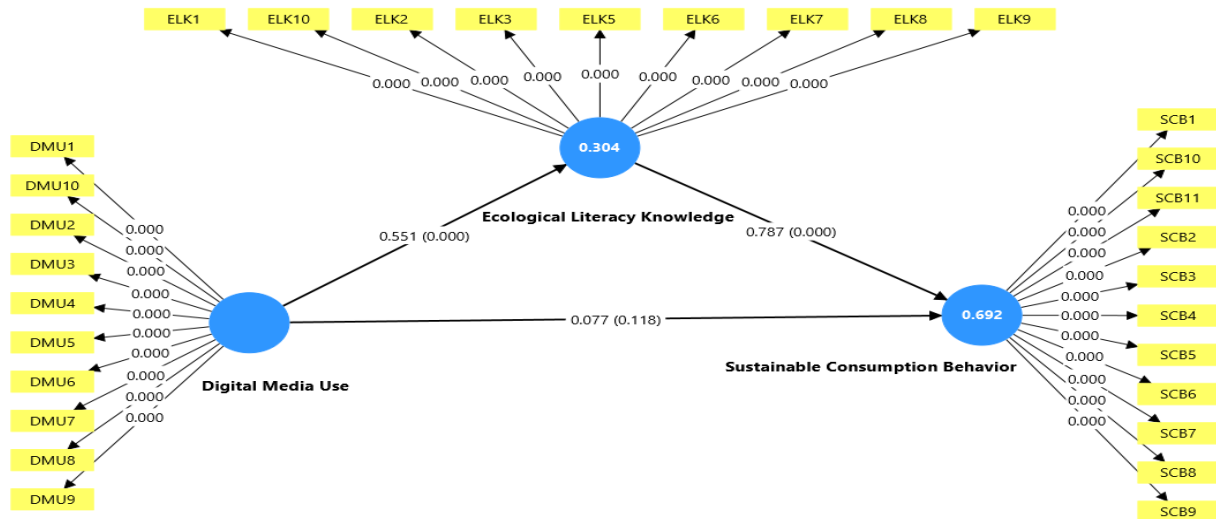


Figure 2. Structural Equation Model

According to Figure 2, the Partial Least Squares (PLS) approach, a variance-based structural equation modeling method, was preferred in testing the research model. The data analysis process was conducted using Ringle et al.'s "SmartPLS 4" software. In testing the model, linear relationships between structures, path coefficients, determination coefficients (R^2), and effect size (f^2) were calculated using the PLS algorithm. Furthermore, to test the statistical significance of the path coefficients in the structural model, t-values were computed using the bootstrap technique with 5000 samples. The model evaluation findings are reported in Table 6, along with R^2 , f^2 , and VIF (Variance Inflation Factor) values. The results for direct effects are presented in Table 7, and the results for indirect effects are presented in Table 8.

When examining the VIF values related to the research model in Table 6, it is seen that the VIF remains below 5 for all variables. This indicates that there is no multicollinearity problem in the model (Hair et al., 2022). According to the R^2 values of the model's dependent variables, 30.4% of the variance of the ELK variable is explained by DMU, while 69.2% of the variance of the SCB variable is explained by DMU and ELK. These values indicate that the explanatory power of the model lies between moderate and elevated levels.

Table 6. Research model coefficients

Independent variable	Dependent variable	VIF	R^2	f^2
Digital media use	Ecological literacy knowledge	1.000	0.304	0.437
Digital media use	Sustainable consumption behavior	1.437	0.692	0.013
Ecological literacy knowledge	Sustainable consumption behavior	1.437	0.692	1.402

According to the f^2 effect size coefficients, the effect of DMU on ELK is moderate ($f^2 = 0.437$), the effect of the same variable on SCB is very low ($f^2 =$

0.013), while the effect of ELK on SCB is considered high ($f^2 = 1.402$). The effect size (f^2) values were interpreted in accordance with Cohen (1988) and Sarstedt et al. (2017). The obtained f^2 value of 0.013 indicates a negligible effect size of Digital Media Use (DMU) on Sustainable Consumption Behavior (SCB). It should be noted that effect size reflects the magnitude of the relationship rather than statistical significance. Therefore, while the effect of DMU on SCB is negligible in magnitude, Ecological Literacy Knowledge (ELK) demonstrates a comparatively stronger effect on SCB.

Table 7. Direct Effect Coefficients

Variables (path)	Standardized β	Standard error	t-value	p
Digital media use $\rightarrow$ Ecological literacy knowledge	0.551	0.045	12.181	0.000
Digital media use $\rightarrow$ Sustainable consumption behavior	0.077	0.049	1.565	0.118
Ecological literacy knowledge $\rightarrow$ Sustainable consumption behavior	0.787	0.037	21.490	0.000

When the values in Table 7 are examined, it is seen that the effect of DMU on ELK is positive and statistically significant ($\beta=0.551$; $p<0.001$). However, the direct effect of DMU on SCB is not statistically significant ($\beta=0.077$; $p>0.05$). On the other hand, the effect of ELK on SCB is highly significant and positive ($\beta=0.787$; $p<0.001$). In this context, hypothesis 2 and hypothesis 3 are supported. According to the findings obtained in Table 8, a significant indirect effect was detected in the path of digital media use $\rightarrow$ ecological literacy knowledge $\rightarrow$ sustainable consumption behavior ($\beta = 0.434$; $t = 10.715$; $p < 0.001$). In this regard, the VAF (Variance Accounted For) value was calculated to evaluate the mediation role of ELK in the aforementioned relationship structure (Hair et al., 2022). The VAF value indicates how much of the total effect was achieved indirectly through the mediation structure (in this case, ELK). VAF value: $VAF < 0.20 \rightarrow$ no mediation effect, $0.20 \leq VAF \leq 0.80 \rightarrow$ partial mediation, $VAF > 0.80 \rightarrow$ full mediation.

Table 8. Indirect Effect Coefficients

Variables (Path)	Standardized β	Standard error	t-value	p
Digital Media Use $\rightarrow$ Ecological Literacy Knowledge $\rightarrow$ Sustainable Consumption Behavior	0.434	0.040	10.715	0.000

In this context, the calculations revealed a VAF value of 84.9%. This 84.9% VAF value indicates that a significant portion of the overall effect between digital media use and sustainable consumption behavior occurs through ecological literacy knowledge. However, while the direct effect of digital media use on sustainable consumption behavior was not statistically significant ($\beta = 0.077$; $t = 1.565$; $p = 0.118$), the effect of digital media use on ecological literacy knowledge ($\beta = 0.551$; $t = 12.181$; $p < 0.000$) and the effect of ecological literacy knowledge on sustainable consumption behavior ($\beta = 0.787$; $t = 21.490$; $p < 0.000$) were found to be statistically significant. Furthermore, the significant indirect effect of digital media use $\rightarrow$ ecological literacy knowledge $\rightarrow$ sustainable consumption behavior

($\beta = 0.434$; $t = 10.715$; $p < 0.000$) indicates that ecological literacy knowledge plays a full mediating role in this relationship.

Table 9. Summary of Hypothesis Testing Results

Hypothesis	Relationship	Result
H1	DMU $\rightarrow$ SCB	Not supported
H2	DMU $\rightarrow$ ELK	Supported
H3	ELK $\rightarrow$ SCB	Supported
H4	DMU $\rightarrow$ ELK $\rightarrow$ SCB (mediation)	Supported

The hypothesis testing results are summarized in Table 9. The findings indicate that H2, H3, and H4 were supported, while H1 was not supported.

Discussion

The findings of this study support previous research in the literature while providing a deeper, theoretically grounded insight into the relationships between Digital Media Use (DMU), Ecological Literacy Knowledge (ELK), and Sustainable Consumption Behavior (SCB). With these findings, the study successfully fills a crucial conceptual gap regarding how environmental knowledge is acquired in digital environments and subsequently translated into actual consumer behavior. While parallel empirical studies by Hu and Meng (2023) and Liu et al. (2024) demonstrate that ecological literacy is a critical element in digital ecosystems, the heavy focus of current literature on traditional agriculture and formal education sectors left the specific mechanism of digital media transformation largely unexamined. This study fills that void, offering an innovative perspective on how ecological knowledge shaped within digital media environments actively reconfigures consumer habits and green product demands.

To understand these dynamics, the empirical findings must be cross-examined with foundational literature. Chen et al. (2015) previously demonstrated that eco-friendly information and green perceptions significantly drive ecological knowledge and sustainable consumption. Similarly, the Propensity Score Matching (PSM) and mediation analyses by Liu et al. (2024) established that digital learning and social literacy serve as structural prerequisites for ecological awareness. Furthermore, Chen et al. (2018) highlighted that environmental awareness and social influence are decisive in predicting ELK and SCB across diverse regional samples. While the strategic and macromarketing roles of digital transformation and digital business models as facilitators of sustainable innovation have been well-documented (Bican & Brem, 2020), and the underlying consumer motivations driving digital media interaction during retail shopping have been established (Childers et al., 2001), the exact behavioral pathway remained obscured. Our empirical model synthesizes these disparate streams by showing that digital media does not act as a direct behavioral trigger, but rather as an information highway that requires a cognitive mediator. This structural mechanism becomes highly evident when analyzing the specific hypotheses tested in this study, three of which were strongly supported. The first hypothesis (H1), which posited that DMU has a direct, statistically significant effect on SCB, was not supported. This non-significant direct path is perhaps the most theoretically compelling finding of the research, as it directly challenges the linear assumptions

often taken for granted in earlier literature. It invalidates the simplistic premise that mere exposure to digital media content or green advertisements automatically translates into environmentally friendly actions. From a theoretical standpoint, this can be explained through cognitive information processing mechanisms: digital media environments are notoriously saturated with information overload, greenwashing, and passive scrolling habits. Consequently, passively receiving eco-friendly information on digital platforms is insufficient to alter deeply ingrained, convenience-driven consumption behaviors. For digital media to influence action, the information must overcome passive consumption, be cognitively processed, and fundamentally re-engineer the individual's mental framework. This critical cognitive threshold is precisely what is captured by the validation of the remaining hypotheses. The second hypothesis (H2) confirmed that DMU has a significant positive effect on ELK, reinforcing the idea that digital media serves as an highly effective tool for environmental information acquisition and green learning. However, as established by the strong support for the third hypothesis (H3), it is the ELK itself—the actual internalized ecological knowledge—that directly drives individuals to execute more environmentally conscious consumption choices.

Ultimately, the robust empirical support for the fourth hypothesis (H4) provides mathematical validation for these underlying mechanisms, confirming that ecological literacy knowledge (ELK) exerts a full mediating effect on the relationship between digital media use (DMU) and sustainable consumption behavior (SCB). This mediation proof underscores the core theoretical contribution of our study: digital media use possesses no autonomous power to generate sustainable behavior; its value lies entirely in its capacity to foster ecological literacy. The effect of digital media on sustainable consumption is purely indirect, operating sequentially through the cultivation, internalization, and execution of ecological knowledge.

Conclusion

This study has revealed the decisive role of ELK in digital media environments on SCB. The findings show that DMU does not directly affect sustainable consumption but facilitates meaningful transformation through ecological literacy. In this context, it is emphasized that increasing environmental knowledge and awareness on digital platforms is critical to achieving sustainability goals. The study fills essential gaps in the literature on how ecological literacy operates in the digital context, offering theoretical and practical contributions that will guide the design of digital strategies for developing SCB.

On the other hand, certain limitations in this study influence the findings. Future research could address these limitations. The primary limitation of the study is that the sample includes only individuals residing in Türkiye, aged 18 and over, who have online shopping experience. This raises the possibility that levels of ELK in the context of DMU may differ between different age groups living in various locations and offline consumers. Indeed, upon examining the sample distribution, some demographic imbalances are noticeable. The fact that women constitute the vast majority of participants, combined with the high representation of housewives in the sample, has created a clear imbalance in the

sample structure. In contrast, some occupational groups, such as lawyers and doctors, are represented at an exceptionally low rate. Similarly, while the majority of participants were concentrated in the 25–34 and 35–44 age groups, older age groups were underrepresented in the study. The high representation of married individuals in terms of marital status is also noteworthy. The predominance of bachelor's degree holders in terms of educational level, combined with the limited number of master's and doctoral degree holders, may prevent attitudes related to educational level from being adequately reflected.

In addition, the fact that the majority of participants fall into the $\geq 50,001$ Turkish Liras (approximately 1,250 USD) income group means that the attitudes of individuals with lower income levels towards SCB cannot be adequately assessed. These demographic differences have led to some groups showing more pronounced trends than others in the analysis results. Therefore, more balanced, representative, and diverse sample structures may be preferred in future studies. This would enhance the generalizability of the findings and enable a more comprehensive examination of the differences in attitudes, perceptions, and behaviors between diverse groups.

The structural model tested in this study, unlike previous empirical research such as Hu and Meng (2023) and Liu et al. (2024), examines how this development translates into consumer behavior rather than how ecological literacy develops in the digital context. Thus, the research fills the theoretically missing links in the triangle of digitalization, environmental knowledge, and sustainability, proposing a new model that integrates ecological literacy into the dynamics of DMU.

Existing studies primarily focus on ecological literacy as an individual level of awareness, as seen in McBride et al. (2013). However, this study models, using empirical data, how this level of understanding is shaped through digital media and how it is reflected in consumption behaviors. In this respect, the research retheorizes ecological literacy in the context of digital media, offering a reconstruction of the concept. Therefore, this study demonstrates that (1) ecological literacy is a structure shaped in digital environments that guides behavior, (2) the cognitive and emotional dynamics behind SCB need to be redefined, and (3) reveals that DMU operates in relation to sustainability not directly, but through a cognitive filter, thereby offering both explanatory and transformative theoretical contributions to the literature.

This study demonstrates that environmental information acquired through digital platforms promotes SCB via the ELK pathway. The findings reveal that digital media not only increases environmental awareness but can also serve as a strategic tool in transforming this awareness into attitudes and behaviors. Developing content strategies tailored to different social media platforms can help enhance this effect. For example, detailed and informative videos can be prepared on YouTube to convey in-depth ecological information to viewers; short, visually-heavy, and actionable Reels content on Instagram can provide quick access to a broad audience; creative and entertaining short videos on TikTok can attract the attention of young users (Pera & Aiello, 2024); environmental-themed podcast series can be prepared on audio-based platforms such as Spotify; and interactive panels, infographics, and simplified guide content on websites can

facilitate users' access to information. Such platform-focused content strategies can both increase users' awareness levels and positively change their attitudes and behaviors. Furthermore, the effectiveness of raising environmental awareness through social media can vary depending on the platform and user compatibility (Hajri & Daife, 2024). These findings serve as a guide for institutions, policymakers, and content creators seeking to increase environmental awareness through digital platforms, providing platform-specific and target audience-appropriate strategic content plans.

This study was approved by the Social and Human Sciences Ethics Committee of Erciyes University (Approval No: 386, Date: 27 August 2024). The research was conducted in accordance with the ethical guidelines and regulations of the aforementioned ethics committee.

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