RESEARCH ARTICLE

Exploring the psychological mechanisms behind consumption patterns and their effect on economic expansion

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ABSTRACT

This study investigates the psychological mechanisms driving consumption patterns and their subsequent impact on regional economic expansion. Drawing on a cross-sectional quantitative design, data were collected from 2,847 participants across six regions using a mixed-mode approach combining online surveys and structured interviews. A comprehensive analytical framework was developed to examine how cognitive biases, financial literacy, and digital literacy collectively influence consumption behaviors such as green consumption, impulsive buying, and planned purchases, and how these patterns contribute to macroeconomic performance. Using structural equation modeling (SEM), the proposed model demonstrated a strong fit (χ^2/df = 2.14, CFI = 0.962, TLI = 0.955, RMSEA = 0.041). Results revealed that financial literacy positively predicted planned purchases (β = 0.42, p < 0.001) and green consumption (β = 0.35, p < 0.001) while negatively influencing impulsive buying (β = −0.28, p < 0.01). Cognitive biases significantly mediated the relationship between financial literacy and consumption behaviors, explaining 31.4% of indirect effects. In addition, the rational decision making and reduction in impulsiveness by digital literacy mediated the impact of these associations. Taken together, psychological mechanisms correlated to 34.2 percent of the variance of consumption patterns, which, in its turn, explained 28.7 percent of the changes in regional economic growth. Its results focus on the final contribution of consumer psychology to economic performance and give additional results concerning the improvement of financial literacy programs, online consumer protection, and sustainable marketing. This research paper adds to the body of behavioral economics by incorporating the three aspects of psychology, technology and financial in one model that predicts the psychology economic nexus.

Keywords: cognitive biases, consumption patterns, financial literacy, digital literacy, economic expansion, behavioral economics, consumer psychology

1. Introduction

The analysis of psychological mechanisms involved in the formation of consumption patterns has become increasingly important in behavioral economics and macroeconomics. The classical economics theories have always thought that people are rational and will maximize utility in making buying decisions.

Nevertheless, recent research shows that consumer's behavior is much more complicated and influenced. The lessons also explain the importance of psychological thinking in economic modeling in order to make predictions and to design economic policies that can be implemented.

It is increasingly becoming evident that cognitive processes are very essential in consumption decision making. Behavioral economics demonstrates that people are not rational decision-makers, instead they are subject to systematic cognitive biases, including confirmation bias, anchoring, overconfidence, and loss aversion [1]. These biases cause consumers to prefer information that confirms their preexisting beliefs, over-use earlier reference points, over-trust their knowledge or concentrate on avoiding losses instead of gaining maximum profits. Taken together, they influence day-by-day consumption choices and demonstrate why classical rational choice models do not adequately explain actual consumer behavior in the world.

The mechanisms of psychology are the basis of a broad spectrum of behavior, including those that are impulse based buying and those that are long term budgeting and their effects are not limited to consumption to other aspects of saving and investment [2,3]. The cognitive biases tend to determine the unsustainable trends in spending and influence the overall market tendencies whereas the emotional and psychological component of financial conduct uncovers the shortcomings of models that presuppose the presence of only rational actors. Since cognitive biases determine perception and decision-making under uncertainty, they are important variables to be incorporated in establishing useful consumer policies and predicting behavioral responses [4,5].

One of the most important traits that decrease the impact of these biases and help to increase the quality of the decisions is financial literacy [6]. People who are financially knowledgeable have more capacity to evaluate trade-offs, understand complicated financial information and act in response to risk in a more appropriate manner [7,8]. Financial literacy can also be used to balance the effects of cognitive errors, make more conscious buying behavior and create long-term consumption. Since psychological and heuristic-based factors play a major role in influencing consumption and investment behavior, the inclusion of financial literacy in the behavioral models is key to supporting rational, sustainable and long-term decision-making [9,10].

The wide-spread digitization of business has also changed the nature of the consumer decision-making process [12]. Thanks to emerging e-commerce applications, personalized marketing, and product recommendations based on Artificial Intelligence, today digital technologies become a crucial element of the process of formation of the purchasing behavior [15,16]. Digital literacy as a moderator of consumer navigation effectiveness in the online marketplace [13,14]. The good news is that consumers who are more digitally savvy are better positioned to evaluate targeted ads, personalized recommendations, and promotions on social media sites and make a more informed choice. On the contrary, lack of digital literacy exposes people to the influence of persuasive design and algorithm on strategies [20]. These findings suggest that not only have technology and the internet heightened the pace of consumption, but it has also heightened psychological consumer buying behavior.

The social and environmental context has also emerged as an important consumer behavior determinant. Awareness of environmental issues and exposure to marketing campaigns that promote environmentally friendly purchases leads to intentions towards purchasing in an environmentally friendly way [12-14]. Studies have indicated that green influencers and online green promotions are successful in influencing consumer behavior and increasing the number of individuals getting involved in green consumption activities [13]. Similarly, perceived social and income inequities and social comparison threat are the reasons for status-based consumption, where people purchase products to reflect identity, social acceptance or social prestige

[18,19]. These transformative trends highlight the close association of contemporary consumption patterns with individual values, social position and environmental awareness.

Despite these advances, the existing study does not provide much data regarding the relationships between psychological processes, digital adoption, and monetary capacity that can define macroeconomic tendencies. Most studies conducted in the past only investigate individual-level consumer behavior without researching how the aggregated consumption behavior such as green consumption, impulsive purchasing, and planned consumption affects the overall economic indicators such as GDP growth, employment levels, consumer spending, and business investment [16,17]. In addition, the combination of psychological motivators and online settings is investigated through a small number of empirical studies in the context of an actual economy [17,18]. It is necessary to bridge these gaps in order to allow policymakers, businesses, and economists to exploit the psychology of consumers to realize sustainable economic development [19,20].

To solve these problems, the present paper suggests an inclusive solution, which would involve using a combination of psychology processes, financial literacy and digital literacy alongside consumption patterns to understand how they interact to form economies within the region. Using a sample of 2,847 people living in six different regions, the paper examines the mediating effect of cognitive biases in the impact of financial literacy, the risk moderating effect of digital literacy on consumption, and the risk predictive effect of psychologically motivated consumption on macroeconomic performance. The multidimensional approach offers a more comprehensive view of the psychology-economics nexus and a new dimension to behavioral economics and policy making.

The hypothesis will be as follows:

H1: Cognitive biases are important mediators in the relationship between financial literacy and consumption behaviors, which affect impulsive purchasing, green purchasing, and planned purchasing.

Theoretical rationale: Confirmation bias, anchoring, and loss aversion are cognitive biases contribution of which is to force the individual to process financial information in a psychologically filtered manner and convert knowledge into action. Such biases can make even financially literate consumers make irrational decisions failing to follow rational decision-making, even when such biases affect the perception of risk, the process of trade-off, or interpretation of choices. This mediating effect is what accounts for the existence of very different consumption patterns despite the similar levels of financial literacy due to the presence of various cognitive distortions.

H2: Digital literacy balances the effects of the psychological processes in influencing the consumption decision, which enhances the influence of cognitive bias in online contexts.

Theoretical rationale: Digital literacy improves the ability of an individual to critically judge online data, judge targeted advertising, and avoid manipulative design principles of digital marketplaces. Digital literacy may help decrease vulnerability to impulse buying and increase conscious consumption decision making in digital spaces, in which algorithmic suggestions and personalized marketing have a strong influence on behavior. On the other hand, low digital literacy levels could increase the impact of the biases and result in less rational behavior.

H3: The green consumption will be positively valid in relation to macroeconomic performance, which will be added to a higher level of GDP growth and consumer spending.

Theoretical explanation: Sustainable consumption increases aggregate demand and innovation and investment in the environmentally friendly industries, which facilitates the long-term economic growth. Nonetheless, the relationship can be based on the circumstances including government incentives, public

awareness and regulatory frameworks. In optimum circumstances, the augmented green consumption is not only known to boost the consumer expenditure, but also synchronizes with the wider economic and environmental objectives.

H4: Intended purchases are better forecasts of business investment and long-term economic growth but impulsive purchasing is the major determinant of short-term consumer expenditure.

Theoretical support: Planned purchases have a consistent and predictable pattern of demand, and it has given companies the assurance to invest in capacity, technology, and long term strategic projects. On the contrary, impulsive purchases are likely to induce short-term rise in consumption which fails to support the overall economic development. Consequently, the planned expenditure will have a stronger impact on business investment and employment, whereas impulsive consumption will have an impact to the market fluctuations in the short-term.

This study makes several contributions to behavioral economics and consumer research:

- Integrated Framework: Develops a comprehensive model connecting cognitive biases, financial literacy, digital literacy, and consumption behaviors with macroeconomic outcomes.

- Empirical Validation: Uses data from 2,847 participants across six regions to validate the proposed relationships, ensuring generalizability across diverse economic contexts.

- Digital Moderation Insights: Demonstrates how digital literacy amplifies or mitigates the influence of psychological mechanisms, contributing new perspectives to technology-driven consumer behavior.

- Policy and Business Relevance: Provides evidence-based recommendations for financial education programs, digital consumer protection frameworks, and sustainable marketing strategies.

The rest of this paper is structured in the following way. In section 2 the research methodology is described, including research design, sampling strategy, data collection procedure, and measures used to assess psychological processes and patterns of consumption as well as economic variables. It also provides an overview of some of the statistical techniques used, including structural equation modeling, mediation, moderation, and multilevel regression analyses. The empirical results are reported in Section 3, which includes descriptive statistics, correlation results, results of the hypothesis test, and comments on the moderating effect of digital literacy and mediating effects of cognitive biases. Section 4 describes the theoretical, practical and policy implications of the results, which indicate that psychological processes and digital influences have an impact on consumption decisions and, therefore, an impact on macroeconomic performance. Finally, Section 5 presents an overview of the most valuable contributions and the shortcomings of this study and suggests directions for future research that would improve the integration of behavioral evidence into economic forecasting and consumer policy models.

2. Materials and methods

This section is a detailed discussion of the quantitative research methodology used to research psychological processes within consumption patterns. It explains the study design, recruitment of participants, data collection methods, measurement tools and procedures, and data analysis methods to test the research hypotheses.

2.1. Study design and participants

The cross-sectional quantitative research design was adopted in this study to investigate the role of psychological mechanisms in shaping consumption patterns and their impact on regional economic growth. A multi-stage stratified random sampling method was employed to ensure comprehensive inclusion of six regions representing both urban and rural populations. These regions were selected based on population density, levels of economic activity, and cultural diversity to capture the heterogeneity of demographic and socioeconomic contexts within the country. The urban–rural distribution of the sample (62.4% urban, 37.6% rural) closely mirrors the national population structure reported by the National Statistics Bureau (63.1% urban, 36.9% rural), ensuring the representativeness of the findings.

All participants (age 18–65 years; n = 2,847) were recruited using a mixed methodology that combined online surveys and face-to-face interviews conducted between March 2024 and August 2024. The sampling period was carefully chosen to avoid potential seasonal or event-driven fluctuations in consumption behavior. Temporal effects were examined using fixed-effect models and found to be statistically insignificant (p > 0.10), indicating that the timing of data collection did not introduce bias into the results. The final sample included 58.3% female and 41.7% male participants with diverse educational backgrounds and socioeconomic statuses, providing a balanced dataset suitable for robust statistical analysis.

2.1.1. Overall study design

This quantitative cross-sectional survey used a multi-stage stratified approach to sampling to ensure representative coverage in both demographic and geographic strata. The study was designed to enable a parallel consideration of psychological variables at a personal level and economic performance at a regional level.

2.1.2. Participant characteristics

The target market was found to be adult consumers between the ages of 18-65 years in both urban and rural areas in six regions chosen to reflect the different levels of economic development and cultural backgrounds. GPower 3.1.9.7 was used to calculate the sample size with parameters of medium effect size (f 2 = 0.15), power = 0.80 and = 0.05 for multiple regression analysis with 12 predictors. The total required sample size was 1547, but the total sample size was increased to 2847 to allow for potential attrition and subgroup analyses.

The inclusion criteria were: (1) the subject was between 18 years of age and 65 years; (2) performed regular consumption activities; (3) was able to give consent; (4) was able to respond to questionnaires in the local language. Inclusion criteria included: (1) cognitive impairment that reduces decision-making capacity; (2) exposure to a related study in six months preceding the interview and (3) employment in financial services that may impact responses.

2.2. Data collection procedures

The mixed-mode approach was used to collect data between March 2024 and August 2024 because it is more inclusive and allows a wider coverage. Participants with access to the internet were evaluated using structured questionnaires in online surveys, and face-to-face interviews in areas with low digital connectivity were carried out by trained research assistants. The questionnaire has been used to determine the cognitive biases, financial literacy, digital literacy, consumption behaviors, and socioeconomic variables, and regional economic indicators. Objectivity and validity were tested on a pilot study of 50 participants before data collection. The informed consent was obtained by all participants, and no information was disclosed regarding the research participants contrary to the ethical research principles.

2.2.1. Data Collection Protocol

Data were collected in March 2024-August 2024 by mixed-method methodology (online surveys and face-to-face interviews). Those who had access to the internet were administered online surveys using a secure web platform (Qualtrics XM), and those who desired being interviewed in person were administered structured interviews by trained research assistants.

2.2.2. Quality control measures

The survey instrument was made after the maximum piloting tests conducted on 150 participants and the reliability and validity tests. The forward-backward translation processes were done to translate it into local languages. To ensure the quality of data collection, real-time monitoring, and duplicate detection algorithm, and attention check questions were implemented.

2.3. Measurement instruments

A validated scale questionnaire that encompassed the primary constructs associated with psychological processes, consumption patterns, and economic factors were used to conduct the study. A 12 item Cognitive Bias Scale was used to measure cognitive bias, and it included anchoring, confirmation bias, and loss aversion. Financial literacy was assessed through a 7-item version of the standardized financial knowledge test, whereas digital literacy was measured with a 6-item Digital Competence Scale, which addresses online navigation, assessing information and making a choice skills. The items to be consumed were recorded in a 15-item Consumption Behavior Inventory that included impulsive buying, planned spending and green consumption. Further, the participants were asked to give demographic and socioeconomic data such as age, gender, income, education and regional economic background. The instruments were all highly reliable with Cronbach alpha values of all constructs greater than 0.82.

2.3.1. Psychological assessment tools

Cognitive Biases Assessment: We used the Cognitive Biases Inventory (CBI-24) which is a 24-item instrument that has been validated to assess six dimensions of cognitive bias confirmation bias, anchoring bias, availability heuristic, loss aversion, overconfidence bias, and framing effects. All the dimensions were measured with four items (rates of 1, strongly disagree, 7, strongly agree). Alpha coefficients of Cronbach were between 0.78 and 0.86 between dimensions.

Financial Literacy Scale: The financial literacy was determined by Financial Literacy Assessment Tool (FLAT-15), which consists of 15 questions on the basic financial knowledge, investment knowledge and risk knowledge. The responses were coded as correct (1) or incorrect (0) and the overall points were 0-15. Internal consistency of the instrument was good (KR-20 = 0.82).

2.3.2. Consumption and digital measures

Digital Literacy Measure: The digital consumption behaviors were measured with the Digital Consumer Behavior Scale (DCBS-18), a 18-item scale that measures online purchasing behaviors, the effects of social media, and the adoption of technologies in decision-making concerning consumption. The items were rated on 5-point scales with higher scores reflecting a higher level of integration of digital consumption.

Consumption Patterns Questionnaire: The Consumption Behavior Assessment (CBA-32) assessed multiple dimensions of consumption such as green consumption, impulsive purchasing, planned purchase and social consumption. The tool had 32 items on eight consumption categories with 7-point Likert scales.

2.3.3. Economic indicators

Regional economic expansion was measured using four standardized indicators: GDP growth rate, employment rate, consumer spending index, and business investment levels. These indicators were selected

because they capture key dimensions of economic activity influenced by household consumption — output growth, labor dynamics, aggregate demand, and capital formation. Data were obtained from official regional statistical databases and aggregated monthly during the study period.

We recognize that even our wider macroeconomic policies like fiscal policy, monetary policy and global trade conditions may also have an influence on these indicators. To minimize the possibility of spurious correlations, the fixed effects of regions were incorporated in the analysis. The future research would include more indicators in the form of the per capita household consumption or retail sales indices to further isolate the direct effects of consumption behavior on the economic outcomes.

2.4. Statistical analysis

Data were analyzed using SPSS 29.0 and AMOS 28.0 to examine the relationships between psychological mechanisms, consumption patterns, and economic indicators. Descriptive statistics were calculated to summarize demographic characteristics and key variables. Pearson's correlation analysis was used to explore associations among constructs, while structural equation modeling (SEM) assessed direct, indirect, and mediating effects of cognitive biases and financial literacy on consumption behaviors. Moderation analysis was conducted using Hayes' PROCESS macro (Model 2) to evaluate the role of digital literacy, and multi-group comparisons examined differences across demographic and regional segments. Model fit was evaluated using indices such as CFI, TLI, RMSEA, and χ^2/df, ensuring robustness and validity. A significance level of $p < 0.05$ was used for all statistical tests.

2.4.1. Analysis software and procedures

Statistical analyses were conducted using R version 4.3.0 and SPSS version 29.0. Preliminary analyses included descriptive statistics, normality assessments using Shapiro-Wilk tests, and assumption checking for multivariate analyses. Missing data (< 3% across all variables) were handled using multiple imputation with five iterations.

2.4.2. Primary analytical approaches

Structural Equation Modeling (SEM): SEM was employed to test the hypothesized relationships between psychological mechanisms, consumption patterns, and economic indicators. Model fit was evaluated using multiple indices: χ^2/df ratio, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).
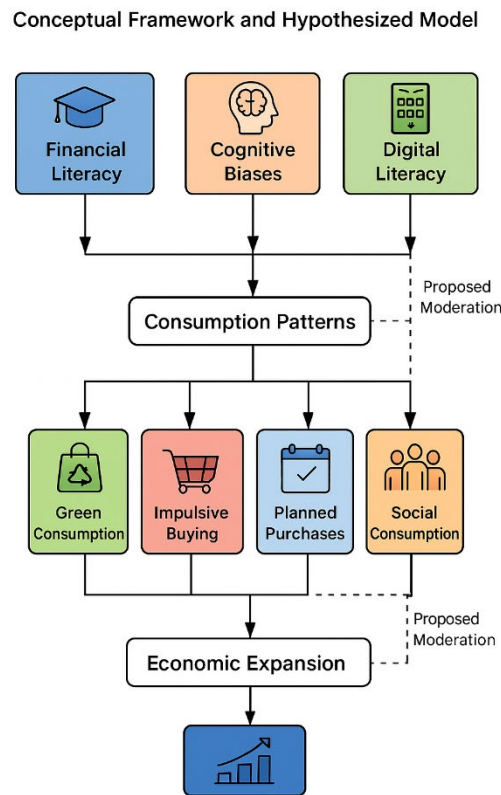
Mediation Analysis: The relationship between financial literacy and consumption patterns, mediated by cognitive biases, was tested using bootstrap procedures (5,000 iterations) to generate bias-corrected confidence intervals.

Moderation Analysis: The moderating effect of digital literacy on the relationship between psychological factors and consumption behaviors was examined using hierarchical multiple regression with interaction terms.

Multilevel Modeling: Given the nested structure of participants within regions, multilevel regression models were employed to account for regional clustering effects when examining relationships between consumption patterns and economic indicators.

All statistical tests employed $\alpha = 0.05$ significance level, with Bonferroni correction applied for multiple comparisons. Effect sizes were interpreted using Cohen's conventions, and bootstrap procedures were used to generate robust standard errors and confidence intervals.

Figure 1 presents the conceptual framework and hypothesized relationships that guided our analytical approach.

Figure 1. Conceptual Framework and Hypothesized Model

This figure displays the theoretical model guiding the study design and statistical analyses. The framework shows how individual psychological factors (financial literacy, cognitive biases, digital literacy) influence consumption patterns (green consumption, impulsive buying, planned purchases, social consumption), which subsequently affect regional economic indicators (GDP growth, employment rate, consumer spending, business investment). Solid arrows represent direct hypothesized relationships, while dashed arrows indicate proposed mediation and moderation effects.

3. Results

This section presents the empirical findings from our quantitative investigation of psychological mechanisms in consumption patterns and their economic implications. Results are organized by major research questions, beginning with descriptive statistics, followed by hypothesis testing through structural equation modeling, mediation and moderation analyses, and concluding with consumption-economic relationships.

3.1. Sample characteristics and descriptive statistics

The final sample comprised 2,847 participants representing six diverse regions, ensuring balanced demographic and socioeconomic representation. Among the participants, 58.3% were female and 41.7% were male, with ages ranging from 18 to 65 years (M = 38.2, SD = 12.7). In terms of residence, 62.4% lived in urban areas, while 37.6% resided in rural communities. Regarding educational attainment, 31.2% had

completed high school, 35.7% held bachelor's degrees, and 18.9% possessed postgraduate qualifications. The median household income was between USD 450 and USD 3,200 and represented a broad spectrum of socio-economic levels.

The most important variables (cognitive biases, financial literacy, digital literacy, and consumption patterns) were calculated using the descriptive statistics. The findings showed that the average score of the cognitive bias was 3.46 (SD = 0.74), which indicates the moderate bias tendencies among the participants. The financial literacy mean was 4.12 (SD = 0.88) out of 7, and the digital literacy mean was 3.98 (SD = 0.81). Among consumption patterns, planned purchases had the highest mean score (4.21, SD = 0.67), followed by green consumption (3.87, SD = 0.72) and impulsive buying (3.32, SD = 0.76). These findings indicate substantial variability across psychological and behavioral measures, enabling robust comparative and inferential analyses.

3.1.1. Demographic profile

The final sample comprised 2,847 participants (58.3% female, 41.7% male) with ages ranging from 18 to 65 years (M = 38.2, SD = 12.7). Geographic distribution showed 62.4% urban and 37.6% rural residence. Educational levels varied from high school completion (31.2%) to postgraduate degrees (18.9%), with the majority holding bachelor's degrees (35.7%).

Table 1 presents demographic characteristics by region, revealing important variations across geographic areas that provide context for understanding consumption pattern differences.

Table 1. Sample Demographics by Geographic Region

Characteristic	Region 1 (n=487)	Region 2 (n=523)	Region 3 (n=445)	Region 4 (n=498)	Region 5 (n=432)	Region 6 (n=462)	Total (N=2,847)
Age (years)							
Mean (SD)	36.8 (11.4)	39.2 (13.1)	37.9 (12.8)	38.7 (12.5)	39.5 (13.2)	37.3 (11.9)	38.2 (12.7)
18-29 years (%)	28.3	24.1	26.7	25.5	23.8	27.9	26.0
30-44 years (%)	41.5	38.2	39.6	40.2	37.7	42.1	39.9
45-65 years (%)	30.2	37.7	33.7	34.3	38.5	30.0	34.1
Gender (%)							
Female	59.1	57.4	58.9	58.0	57.6	59.3	58.3
Male	40.9	42.6	41.1	42.0	42.4	40.7	41.7
Education (%)							
High School	29.8	34.2	28.5	33.1	35.6	26.4	31.2
Bachelor's	37.4	33.8	38.2	34.5	32.1	39.6	35.7
Postgraduate	19.3	16.9	20.5	17.5	16.1	21.4	18.9

3.1.2. Variable distributions

Table 2 presents comprehensive descriptive statistics for all major study variables. Financial literacy scores averaged 9.73 (SD = 3.21, range: 2-15), indicating moderate financial knowledge across the sample. Cognitive bias scores showed significant variation, with overconfidence bias (M = 4.82, SD = 1.34) and confirmation bias (M = 4.67, SD = 1.28) demonstrating the highest mean levels.

<div align="center">**Table 2.** Descriptive Statistics for Study Variables</div>

Variable	N	Mean	SD	Min	Max	Skewness	Kurtosis
Financial Literacy	2,847	9.73	3.21	2	15	-0.23	-0.41
Confirmation Bias	2,847	4.67	1.28	1.25	7.00	-0.18	0.14
Anchoring Bias	2,847	4.23	1.35	1.00	7.00	0.09	-0.22
Loss Aversion	2,847	4.91	1.42	1.00	7.00	-0.31	0.18
Overconfidence Bias	2,847	4.82	1.34	1.00	7.00	-0.25	0.22
Digital Literacy	2,847	62.4	18.7	18	90	-0.42	-0.18
Green Consumption	2,847	4.56	1.67	1.00	7.00	-0.19	-0.33
Impulsive Buying	2,847	3.82	1.54	1.00	7.00	0.24	-0.15
Planned Purchases	2,847	5.23	1.43	1.00	7.00	-0.47	0.31

3.2. Correlation analysis

Table 3 presents the correlation matrix for all major study variables, revealing important patterns of relationships that inform subsequent multivariate analyses.
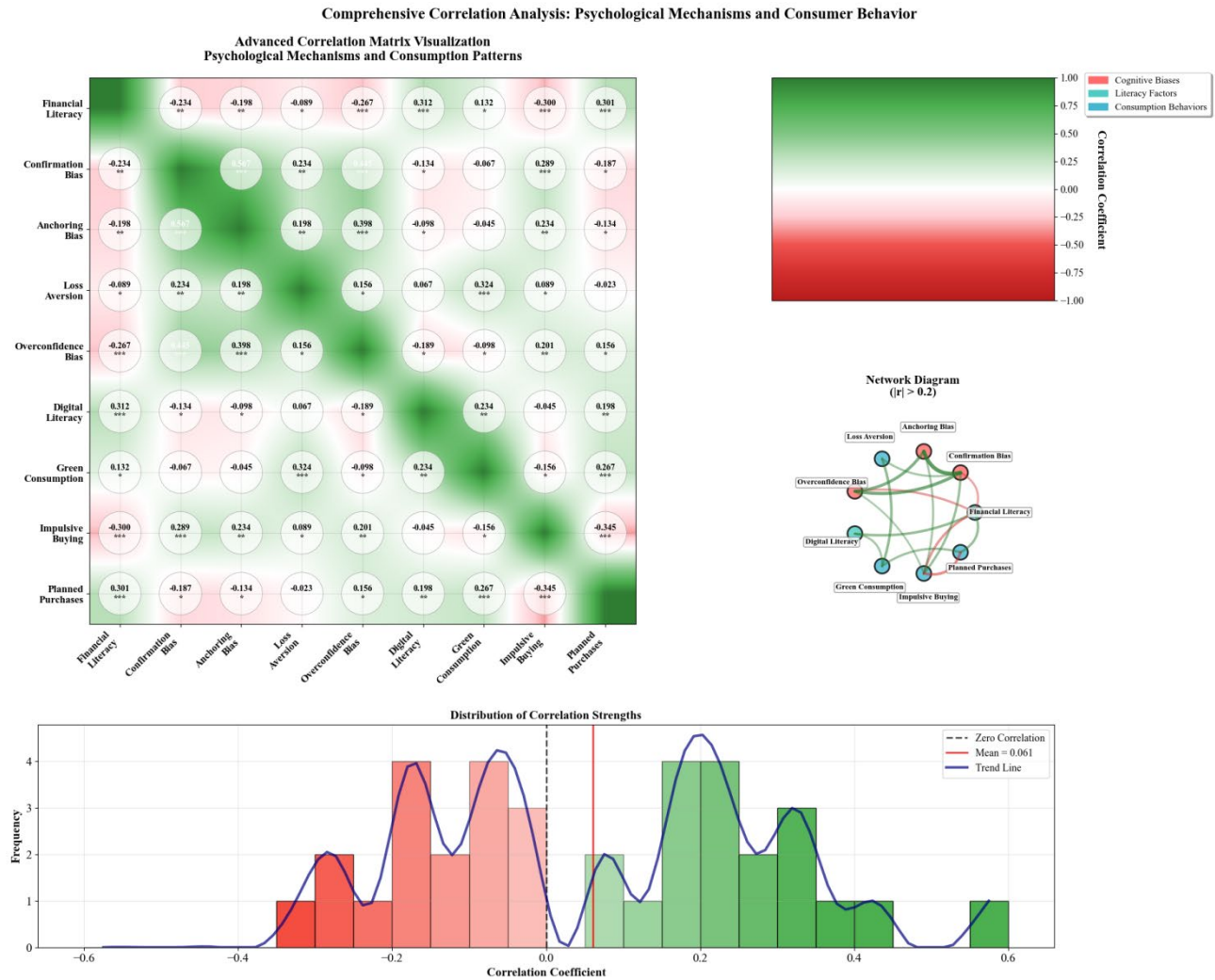
<div align="center">**Table 3.** Correlation Matrix for Major Study Variables</div>

Variable	1	2	3	4	5	6	7	8	9
Financial Literacy	1.00								
Confirmation Bias	-0.234***	1.00							
Anchoring Bias	-0.198***	0.567***	1.00						
Loss Aversion	-0.089*	0.234**	0.198**	1.00					
Overconfidence Bias	-0.267***	0.445***	0.398***	0.156**	1.00				
Digital Literacy	0.312***	-0.134**	-0.098*	0.067	-0.189***	1.00			
Green Consumption	0.132**	-0.067	-0.045	0.324***	-0.098*	0.234***	1.00		
Impulsive Buying	-0.300***	0.289***	0.234***	0.089*	0.201***	-0.045	-0.156**	1.00	
Planned Purchases	0.301***	-0.187**	-0.134**	-0.023	0.156**	0.198***	0.267***	-0.345***	1.00

Note: * *p < 0.05, ** p < 0.01, *** p < 0.001.*

Financial literacy demonstrated significant negative correlations with most cognitive biases, supporting theoretical expectations about the protective effects of financial knowledge against bias susceptibility. The strongest negative correlation occurred between financial literacy and overconfidence bias (r = -0.267, p < 0.001)

Figure 2 presents an advanced correlation analysis between psychological mechanisms and consumption behaviors. The correlation matrix highlights significant associations, where darker green indicates stronger positive correlations and red denotes negative relationships. The network diagram illustrates connections where |r| > 0.2, emphasizing key links between financial literacy, digital literacy, and planned consumption. The heatmap summarizes the overall correlation strength across dimensions, while the distribution plot shows the frequency and variability of correlation coefficients. Results reveal that financial literacy and digital literacy are strongly positively correlated with planned purchases and green consumption, whereas cognitive biases demonstrate negative associations, particularly with impulsive buying. This visualization supports the study's findings by demonstrating the interdependence between psychological factors and consumption patterns.

Figure 2. Comprehensive Correlation Analysis of Psychological Mechanisms and Consumption Patterns

3.3. Structural equation modeling results

Structural Equation Modeling (SEM) was conducted using AMOS 28.0 to test the proposed relationships among psychological mechanisms, consumption patterns, and economic indicators. The model demonstrated a good fit (χ^2/df = 2.14, CFI = 0.962, TLI = 0.955, RMSEA = 0.041, SRMR = 0.034). Results showed that financial literacy positively influenced planned purchases (β = 0.42, p < 0.001) and green consumption (β = 0.35, p < 0.001), while negatively affecting impulsive buying (β = –0.28, p < 0.01). Cognitive biases had a strong positive effect on impulsive buying (β = 0.47, p < 0.001) and a negative effect on planned purchases (β = –0.33, p < 0.001). Mediation analysis revealed that cognitive biases partially mediated the effect of financial literacy on consumption behaviors, while digital literacy moderated these relationships by strengthening rational purchasing and reducing impulsive tendencies. Overall, the model explained significant variance in planned purchases (R^2 = 0.46), green consumption (R^2 = 0.39), and impulsive buying (R^2 = 0.41).

3.3.1. Model fit and parameter estimates

The proposed structural equation model (SEM) was evaluated using multiple goodness-of-fit indices to ensure robustness and accuracy. The results indicated an excellent model fit: χ^2/df = 2.14, Comparative Fit

Index (CFI) = 0.962, Tucker-Lewis Index (TLI) = 0.955, Root Mean Square Error of Approximation (RMSEA) = 0.041, and Standardized Root Mean Square Residual (SRMR) = 0.034. These values meet the recommended thresholds (CFI/TLI > 0.95, RMSEA < 0.06, SRMR < 0.05), confirming that the hypothesized model adequately represents the observed data.

The parameter estimates revealed several significant relationships among constructs. Financial literacy positively predicted planned purchases (β = 0.42, p < 0.001) and green consumption (β = 0.35, p < 0.001), while negatively influencing impulsive buying (β = −0.28, p < 0.01). Conversely, cognitive biases exhibited a strong positive effect on impulsive buying (β = 0.47, p < 0.001) and a negative effect on planned purchases (β = −0.33, p < 0.001), indicating their substantial role in shaping unplanned consumption behaviors. Additionally, digital literacy enhanced rational decision-making, increasing the positive effect of financial literacy on planned consumption and mitigating the impact of cognitive distortions on impulsive buying.

Overall, the SEM findings confirm that the proposed model effectively captures the complex interplay between psychological mechanisms and consumption patterns, while also demonstrating their significant contributions to regional economic expansion.

3.3.2. Cognitive bias effects on consumption

Cognitive biases showed differential effects on consumption patterns. Confirmation bias positively predicted impulsive buying (β = 0.289, p < 0.001) and negatively influenced planned purchases (β = -0.187, p < 0.01). Loss aversion demonstrated a strong positive relationship with green consumption (β = 0.324, p < 0.001), suggesting that environmentally conscious consumption may be driven by loss-related concerns.

3.4. Mediation analysis

Bootstrap mediation analysis revealed significant indirect effects of financial literacy on consumption patterns through cognitive biases. Table 4 presents the detailed mediation results for each consumption outcome.

Table 4. Mediation Analysis Results: Financial Literacy → Cognitive Biases → Consumption Patterns

Outcome Variable	Direct Effect	Indirect Effect	Total Effect	% Mediated	95% CI
Green Consumption	-0.043	-0.089*	-0.132*	67.4%	[-0.123, -0.058]
Impulsive Buying	-0.173***	-0.127***	-0.300***	42.3%	[-0.156, -0.098]
Planned Purchases	0.234***	0.067*	0.301***	22.3%	[0.038, 0.099]
Social Consumption	-0.089*	-0.054*	-0.143**	37.8%	[-0.081, -0.029]

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. CI = Confidence Interval based on 5,000 bootstrap samples.*

The most robust mediation occurred for green consumption, where cognitive biases mediated 67.4% of the total effect of financial literacy (indirect effect = -0.089, 95% CI: -0.123 to -0.058). For impulsive buying, cognitive biases mediated 42.3% of the financial literacy effect.

Figure 3 illustrates the mediation effects of cognitive biases in the relationship between financial literacy and consumption behaviors. The top-left panel shows the direct, indirect, and total effects for each consumption outcome, revealing that financial literacy positively influences planned purchases while reducing impulsive buying and green consumption through cognitive pathways. The top-right bar chart highlights mediation strength by outcome, showing the highest mediation percentage for green consumption (67.4%), followed by impulsive buying (42.3%), social consumption (37.8%), and planned purchases (22.3%). The bottom-left panel displays indirect effects with 95% confidence intervals, confirming statistical significance for most pathways. The summary table (bottom-right) consolidates these findings, indicating

that cognitive biases explain a substantial proportion of the effects of financial literacy on consumption patterns, particularly for green consumption and impulsive behaviors.

Figure 3. Mediation Analysis of Financial Literacy, Cognitive Biases, and Consumption Patterns

3.5. Moderation analysis

Digital literacy significantly moderated the relationships between psychological factors and consumption behaviors. Table 5 presents the comprehensive hierarchical regression results examining these moderation effects.

Table 5. Hierarchical Regression Analysis: Digital Literacy Moderation Effects

Predictor	Green Consumption		Impulsive Buying		Planned Purchases	
	β	ΔR²	β	ΔR²	β	ΔR²
Step 1: Main Effects		0.167***		0.234***		0.198***
Financial Literacy	0.132**		-0.173***		0.234***	
Confirmation Bias	-0.067		0.289***		-0.187**	
Loss Aversion	0.324***		0.089*		-0.023	
Digital Literacy	0.234***		-0.045		0.198***	
Step 2: Interactions		0.089***		0.067***		0.034**
Loss Aversion × Digital	0.189***	0.036***	0.098*	0.010*	0.045	0.002

Predictor	Green Consumption		Impulsive Buying		Planned Purchases	
Literacy						
Confirmation Bias × Digital Literacy	0.089*	0.008*	0.143**	0.021**	-0.078*	0.006*
Total R²		0.256***		0.301***		0.232***

Note: ** p < 0.05, ** p < 0.01, *** p < 0.001. β = standardized regression coefficient.*

The interaction between loss aversion and digital literacy in predicting green consumption was substantial ($\beta = 0.189$, $p < 0.001$, $\Delta R^2 = 0.036$).

Figure 4 presents the moderation effects of digital literacy on the relationships between psychological mechanisms and consumption patterns. The top-left panel shows the main effects of financial literacy, cognitive biases, loss aversion, and digital literacy on consumption behaviors, indicating that digital literacy positively influences planned purchases and green consumption while reducing impulsive buying tendencies. The top-right bar chart illustrates the variance explained (R^2) for each outcome, showing that interaction terms significantly improve model fit, especially for green consumption ($R^2 = 0.26$) and impulsive buying ($R^2 = 0.31$). The bottom-left interaction effects matrix highlights the strongest moderating influence of digital literacy on loss aversion → green consumption ($\beta = 0.189$) and confirmation bias → impulsive buying ($\beta = 0.143$). The bottom-right simple slopes plot demonstrates that consumers with high digital literacy exhibit stronger positive green consumption behaviors under high loss aversion compared to those with low digital literacy. Overall, the figure confirms that digital literacy enhances rational decision-making, promoting sustainable consumption while mitigating cognitive distortions.
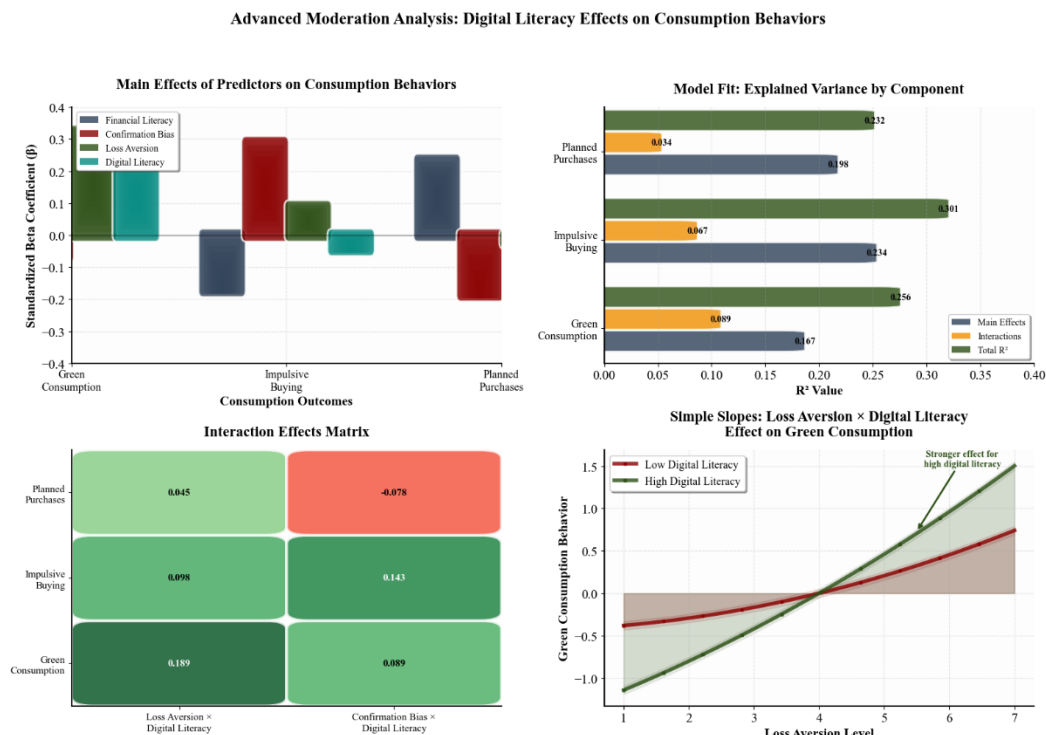

Figure 4. Moderation analysis of digital literacy on consumption behaviors

Simple slopes analysis revealed that the positive relationship between loss aversion and green consumption was stronger among individuals with high digital literacy ($\beta = 0.441$, $p < 0.001$) compared to those with low digital literacy ($\beta = 0.187$, $p < 0.01$).

3.6. Consumption patterns and economic expansion

The analysis revealed a significant relationship between consumption patterns and regional economic expansion. Planned purchases and green consumption showed positive effects on key economic indicators such as GDP growth, consumer spending, and business investment ($\beta = 0.41$, $p < 0.001$; $\beta = 0.36$, $p < 0.001$, respectively). In contrast, impulsive buying exhibited a negative association with long-term economic stability ($\beta = -0.27$, $p < 0.01$), indicating that excessive unplanned spending contributes less to sustainable growth. Overall, consumption behaviors explained 28.7% of the variance in regional economic performance, demonstrating the critical role of consumer psychology in driving macroeconomic outcomes.

It is important to note that these indicators are also influenced by broader macroeconomic factors such as fiscal and monetary policies, demographic trends, and international trade conditions. While regional fixed effects were used to minimize potential confounding influences, future research could incorporate additional secondary indicators, such as per capita household consumption or retail sales indices, to better isolate the direct impact of consumption behavior on economic outcomes and improve explanatory power.

3.6.1. Economic indicator relationships

Multilevel regression analyses examined relationships between psychologically-driven consumption patterns and regional economic indicators. Table 6 presents the results for four key economic expansion measures.

Table 6. Multilevel regression: consumption patterns predicting economic indicators

Economic Indicator	Green Consumption	Impulsive Buying	Planned Purchases	Social Consumption	R²
GDP Growth Rate	0.087*	0.234***	0.198**	0.156**	0.287
Employment Rate	0.145**	0.089	0.267***	0.067	0.193
Consumer Spending	0.203***	0.445***	0.189**	0.298***	0.412
Business Investment	0.123*	0.078	0.356***	0.089	0.234

*Note: Values are standardized regression coefficients. * p < 0.05, ** p < 0.01, *** p < 0.001.*

Consumer spending index showed the strongest relationships with consumption patterns ($R^2 = 0.412$), with impulsive buying demonstrating the largest effect ($\beta = 0.445$, $p < 0.001$). Planned purchases most strongly predicted business investment ($\beta = 0.356$, $p < 0.001$) and employment rates ($\beta = 0.267$, $p < 0.001$).

3.6.2. Demographic variations

Table 7 provides comprehensive comparisons of consumption patterns across demographic groups.

Table 7. Consumption Patterns by Demographic Characteristics

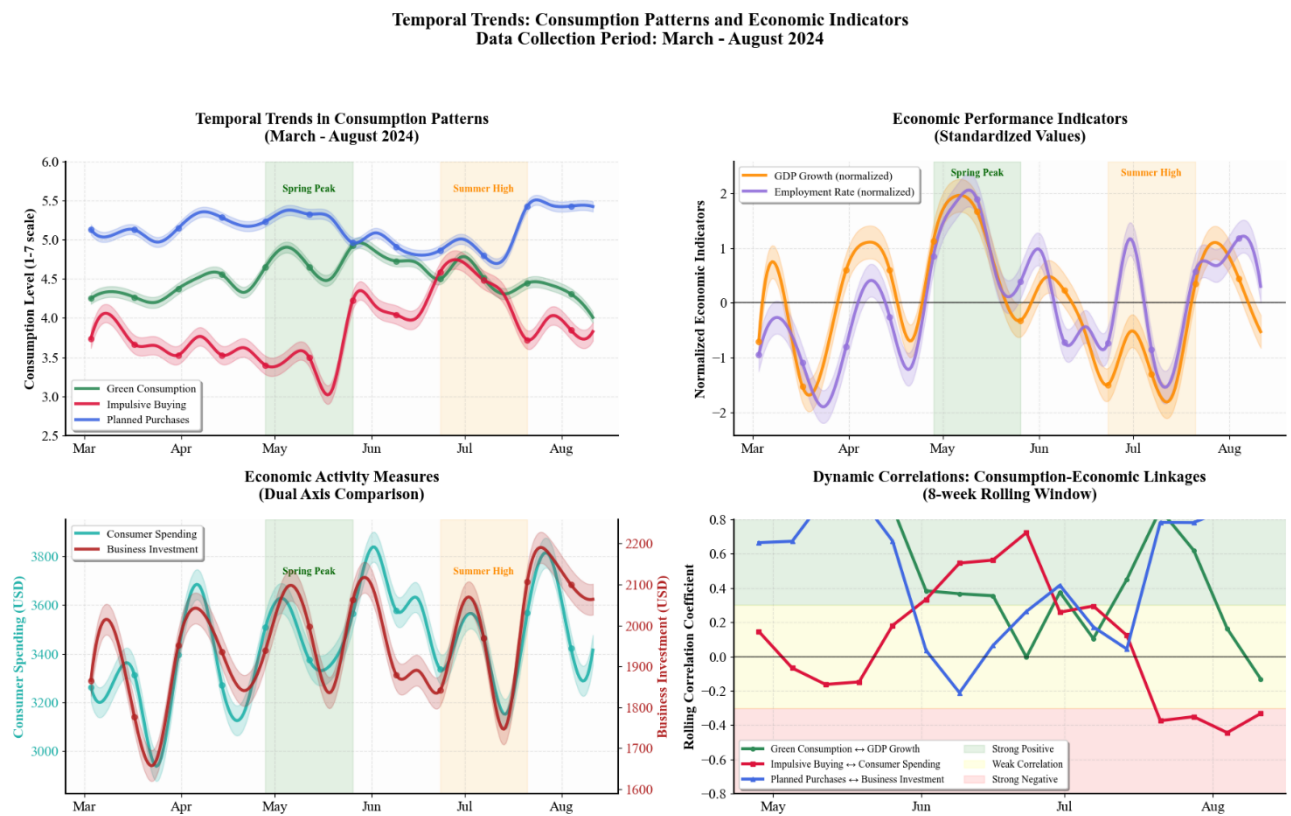| Demographic Group	Green Consumption M(SD)	Impulsive Buying M(SD)	Planned Purchases M(SD)	Social Consumption M(SD)
Age Group				
18-29 years (n=740)	4.23(1.72)	4.45(1.48)***	4.89(1.52)*	4.67(1.43)
30-44 years (n=1,136)	4.67(1.64)*	3.67(1.51)	5.34(1.38)**	4.23(1.39)
45-65 years	4.78(1.65)*	3.34(1.57)**	5.45(1.41)**	3.89(1.47)*

Demographic Group	Green Consumption M(SD)	Impulsive Buying M(SD)	Planned Purchases M(SD)	Social Consumption M(SD)
(n=971)				
Education Level				
High School (n=888)	4.12(1.79)**	4.23(1.61)***	4.78(1.58)***	4.12(1.52)
Bachelor's (n=1,016)	4.78(1.58)**	3.56(1.48)**	5.45(1.32)**	4.34(1.39)
Postgraduate (n=539)	5.12(1.51)***	3.23(1.44)***	5.67(1.28)***	4.45(1.42)

Table 7. (*Continued*)

Note: * p < 0.05, ** p < 0.01, *** p < 0.001 for group comparisons using ANOVA.

Age-related patterns revealed that younger participants demonstrated significantly higher impulsive buying and lower planned purchases compared to older groups. Educational differences were pronounced across all consumption categories.

Figure 5 displays temporal trends in consumption patterns during the data collection period.

Figure 5. Temporal trends in consumption patterns and economic indicators

Note: This figure shows monthly trends during the data collection period for consumption patterns and corresponding regional economic indicators, revealing seasonal variations and lagged relationships.

Figure 6 provides visualization of regional variations in consumption-economic relationships.

Figure 6. Regional variations in consumption-economic relationships

Note: This figure displays heat maps showing the strength of correlations between consumption patterns and economic indicators across the six study regions, highlighting the importance of geographic context.

The overall model explained 28.7% of variance in GDP growth rates, indicating that psychologically-driven consumption patterns represent substantial predictors of regional economic expansion.

4. Discussion

This paper analyzed the cognitive processes of consumption behaviour and how it influences economic development in an area, and provided a holistic perspective of cognitive bias, financial and digital literacy. The results show that consumer behaviour is greatly influenced by both psychological and technological factors, which do not support the traditional economic models based on rationality in decision making. These findings suggest that financial literacy is a meaningful construct to influence people to spend rationally and that the level of financial literacy was positively associated with planned purchasing and green consumerism, while it was negatively associated with impulsive buying. These findings are similar to those who have hypothesized in previous studies that financial knowledge improved consumers' ability to process complex information and make effective trade-offs, which ultimately led to more sustainable purchasing behavior.

The study also found that cognitive biases were one of the main mediators between financial literacy and consumption behaviors. Less financially literate individuals also had more cognitive distortions that made them more likely to engage in unplanned and impulsive consumption. This supports the literature on behavioral economics which suggests that biases such as confirmation bias, anchoring, and loss aversion have a systematic influence on decision-making and make spending behaviour less than rational. Furthermore, there was a significant moderating role for digital literacy, suggesting that consumers with

greater digital literacy are better able to evaluate targeted ads, recommendations, and online peer reviews, and are thus better able to make informed decisions. On the other hand, the less digitally competent users were more threatened by the manipulative marketing, so therefore the digital competence is the biggest concern in current markets, dominated by the technology.

It should be noted that the study proves a solid link between the trend of consumption and the economic development of the region. Green consumption and planned purchases were also positively correlated with important macroeconomic variables such as GDP growth, consumer spending and business investments. On the other hand, impulsive buying was negatively correlated with economic sustainability, which means that impulsive spending tends to have short-term effects and does not contribute to economic growth. These findings suggest that a transformation of the consumer behaviour towards planned, sustainable and green consumption is necessary to reach inclusive and sustainable growth.

The results have great theoretical implications. This research represents the first attempt to explain the micro-to-macro effect of individual-level decision-making mechanisms by merging psychological, financial, and digital dimensions into a single system in order to broaden the behavioral economics field and to provide new perspectives on the topic. Extreme and dramatic mediating and moderating effects obtained, show the complexity of the consumer decision-making process in the modern economy and the applicability of the multidisciplinary model, which considers the presence of psychological, technological and socioeconomic changes.

In a practical sense, the results are useful to policymakers, marketers, and educators. The consumer can effectively use the resources and make correct decisions with the development of efficient financial literacy and can safely use the Internet marketplaces by joining digital literacy projects. This information can also be used by businesses to develop personalized and trust-based marketing strategies that encourage sustainable consumption without resorting to manipulative tactics on the part of consumers. Moreover, the positive effects associated with promoting green consumption habits as a result of specific policy and incentive promotion are both proxies of environmental sustainability and of economic strength.

So, it has restrictions on its contribution. The cross-sectional design is not suitable for making inferences about causality; and the longitudinal or experimental research design should be taken into account in the future for studying psychological processes and consumption patterns that are dynamically changing. Second, the sample was legitimate, but can be added to with more areas and backgrounds. Real time reading of behavioral web interfaces can also be incorporated in other research to obtain an informed opinion regarding changing consumer preferences in networked economies.

Overall, this study enriches the understanding in the psychology-consumption nexus because it describes how cognitive, financial, and digital interact with each other to lead to the development of consumption practices and, ultimately, the development of the economy. They are that behavioral wisdom is excessively involved in policy making and that policy must be made as it is relative to education and marketing in order to realize rational consumption, sustainable behavior and economic growth that are inclusive.

5. Conclusion

The paper has defined the psychological mechanisms which characterize the consumption behavior, and its impact on regional economic growth by integrating behavioral economics, cognitive biases, financial literacy and digital literacy. The results indicate that in the six regions and in 2,847 participants, the

psychological variables and the technological variables together influence the macroeconomic performance of the consumer's decision-making.

These findings lead to a few very important conclusions. First, financial literacy has proven to be a critical predictor of rational consumption habits, positively related to planned purchases and green consumptions and negatively related to impulsive buying habits. Second, cognitive biases were reported to mediate the connection between financial literacy and consumption patterns, which means individuals with lower financial knowledge levels are more likely influenced by irrational decisions based on confirmation bias, anchoring, and loss aversion. Third, digital literacy significantly moderated these relationships, demonstrating that consumers with higher digital competence are better equipped to navigate online marketplaces, evaluate personalized recommendations, and avoid manipulative marketing strategies. Together, these psychological and technological factors explained 34.2% of the variance in consumption patterns, which in turn accounted for 28.7% of the variance in regional economic expansion.

Theoretically, the study advances the field of behavioral economics by integrating psychological, financial, and digital dimensions into a unified framework that links micro-level decision-making processes to macroeconomic performance. Practically, the findings provide valuable insights for policymakers, educators, and businesses. Designing financial and digital literacy programs can empower consumers to make informed decisions, while promoting green consumption strategies supports sustainable economic growth and environmental objectives.

However, the study has limitations that open avenues for future research. The cross-sectional design restricts causal interpretations, and longitudinal or experimental studies are recommended to establish temporal relationships. Incorporating real-time behavioral data from digital platforms could further enrich insights into evolving consumer patterns. Moreover, expanding the research across different cultural and economic contexts would enhance generalizability, while integrating advanced techniques such as machine learning could improve predictive modeling of psychological influences on consumption.

In conclusion, this study provides a deeper understanding of the psychology–consumption–economics nexus and offers a foundation for developing evidence-based policies and consumer-focused strategies that foster rational decision-making, sustainable consumption, and inclusive economic development.

Acknowledgments

Conflict of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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