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Evaluation of sustainable consumption behavior according to sociodemographic factors in Indigenous communities

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Abstract

Environmental problems represent one of the greatest threats to humanity, which is why environmental sustainability has become an issue of great relevance. In this context, sociodemographic factors are considered to play a fundamental role in the investigation of sustainable consumption behavior, particularly among residents of Indigenous communities. The present study aims to evaluate sustainable consumption behavior in relation to sociodemographic factors in indigenous communities in the Amazon region of Peru. Data were collected through a survey applied to a sample of 319 people selected by stratified probability sampling. The conceptual model and hypotheses were tested by multivariate analysis and structural equation modeling, using the principal component analysis method for factor extraction. As a result, the research revealed a positive connection between pro-environmental factors and sustainable behavioral intention. However, although sustainable behavioral intention was strong, it did not always translate directly into sustainable practices. Significant differences in gender, age, education, income, and occupation were identified as factors influencing sustainable practices. The results highlight the complexity of sociodemographic factors in the adoption of sustainable lifestyles in Indigenous communities. These findings provide a crucial basis for the development of tailored intervention strategies and the formulation of contextualized policies that promote sustainable consumption in these communities.

Keywords: Pro-environmental behavior, Sustainable consumption, Sociodemographic factors, Indigenous communities, Sustainable development

1. Introduction

Sustainable consumption behavior involves habits where consumers evaluate and consider the subsequent consequences of using goods and services on their quality of life, environmental care, and resources for future generations [1]. From an operational perspective, sustainable consumption behavior is defined based on pro-environmental factors in two orders: first-order factors, which include environmental influences, environmental

knowledge, materialism, promotion of sustainable consumption, and sustainable consumption behavior intention; and second-order factors, encompassing quality of life, environmental well-being, and care for future generations [2]. This approach allows for a more detailed understanding of the components that influence sustainable consumption behavior and facilitates empirical study to understand how it manifests in practice.

On the other hand, the economic evolution of developing countries, driven by the technological revolution and globalization, led to an exponential increase in market-driven consumption patterns, as well as unsustainable consumption [3], [4]. Despite the fact that numerous studies have addressed sustainability issues in different groups of countries, the actions developed in this essential area are extremely limited, and there are no comprehensive studies available that analyze the subject in a unified manner [2]; the rate of pollution seems to be increasing [5] and it is believed that major environmental problems facing our planet partly originate from the excessive consumption of the population [3].

Unsustainable consumption refers to consumption patterns that deplete natural resources and damage the environment, endangering the well-being of future generations [6]. This factor is often driven by unequal exchange relationships that prioritize profit over ecological balance [7]. Currently, this consumption model leads to environmental degradation [8]. Many individuals show low environmental concern and self-efficacy, which hinders their ability to adopt sustainable practices [7] and makes it difficult for consumers to engage in sustainable consumption [8]. This phenomenon contributes significantly to climate change, biodiversity loss, and pollution, which threaten human health and the achievement of the Sustainable Development Goals (SDGs) [6], [9], [10].

In this context, in recent years, sustainable consumption behavior has gained greater attention and debate in public policy and academia [11]. If the current rate of consumption continues, by the year 2050, three times the amount of natural resources that the Earth can provide will be needed to sustain current consumption levels [12]. Achieving sustainability objectives and preserving a healthy environment requires a profound transformation in behavioral patterns at all levels of society, from individual actions to the decisions of leaders [13].

Additionally, household consumption is directly and indirectly responsible for more than 70% of all carbon dioxide emissions worldwide [12], [14], leading to a considerable proportion of the population continuing not to commit significantly to sustainable behavior [12]. Although researchers have shown that humans consume goods and use services at a higher rate than natural ecosystems can regenerate, process, or recycle, most people continue to associate the economy primarily with the production and consumption of material goods [15], [16].

In this scenario, accelerated environmental deterioration, together with climate change and the associated crises, reinforces the imperative need for people to modify their traditional consumption habits towards more sustainable practices in order to ensure safe and healthy living conditions for both present and future generations [17]. Increased consumption does not always come with positive social effects, and unsustainable consumption patterns can put tremendous pressure on the environment [18]. It is unclear whether the concern expressed by consumers for environmental protection translates into environmentally friendly behavior [19]. Therefore, it is necessary to delve deeper into the problem at hand.

For example, previous studies examining the impact of economic, health, and environmental factors on sustainable consumption behavior found that increasing concerns in these areas improve pro-environmental behavior [13]. Similar results were observed by Russell and Knoeri [20] in the UK and Brandão and de Miranda [4] in Europe, Brazil, and North America, highlighting the influence of sustainable consumption behavior on the intention to purchase services. Similarly, there is evidence that a connection to nature positively influences green behaviors [11], while, sustainable consumption patterns in other contexts such as Austria and New Zealand, show similarities influenced by government regulations and geography [12]. So also, there are findings that found that environmental concern is associated with knowledge and perception of environmental risk, which affects intention and meaning in sustainable consumption behavior [16]. However, other studies observed a negative effect of materialism on consumption intentions [3], and highlighted the positive and negative influence of price on

sustainable behaviors [21]. These studies emphasize the importance of connection with nature, government policies, and environmental awareness in sustainable consumption behavior at the global level.

In this sense, this research validates the use of eight dimensions that define sustainable consumption behavior in native communities of the Peruvian Amazon according to the theoretical conceptualization by Dimitrova et al. [2] as there are no similar studies in these populations. Therefore, the objective was to evaluate sustainable consumption behavior according to pro-environmental factors and sociodemographic factors in native communities. Based on this objective, the structure of sustainable consumption behavior was analyzed, sociodemographic factors were explored, and the pro-environmental factors with the most significant impact on sustainable consumption behavior in native communities were identified.

2. Research method

2.1. Research design

A cross-sectional descriptive study was conducted to evaluate sustainable consumption behavior in native communities [22].

2.2. Population and sample

The population consisted of 1,864 inhabitants from native communities in the district of Aramango, Bagua province, in the Amazon region of northern Peru, from which a sample of 319 individuals was estimated. To determine the adequate and representative sample size, it was calculated with a 95% confidence level and a 5% error margin. The selection of the sample elements was carried out through a probabilistic sampling with a proportional stratified sampling technique [23].

2.3. Techniques and instruments

The survey technique was used as the main method for collecting data on sustainable consumption behavior in native communities. For this, a specific questionnaire adapted from Dimitrova et al. [2] was used, which included questions related to consumption practices, perception of sustainability, and sociodemographic factors of the participants. This questionnaire was developed based on existing literature and adapted to the context and reality of the studied communities.

The questionnaire consisted of 27 Likert-scale response questions, ranging from 1 (strongly disagree) to 5 (strongly agree), allowing the collection of quantitative information on sustainable consumption behavior. Items were included to evaluate aspects such as (i) Environmental influences, (ii) Environmental knowledge, (iii) Materialism, (iv) Promotion of sustainable consumption, (v) Intention of sustainable consumption behavior, (vi) Quality of life/well-being, (vii) Care for environmental well-being, and (viii) Care for future generations.

The validity of the questionnaire was established through a review process by experts in the field to ensure its adequacy and relevance. Additionally, pilot tests were conducted to assess the clarity and understanding of the questions by the participants before their final implementation in the research.

2.4. Procedures

Native communities in the district of Aramango, Bagua province, Amazon region, Peru, were selected following a proportional stratified probabilistic sampling method. Community leaders were contacted, and the purpose of the study was explained. A specific questionnaire was designed to evaluate sustainable consumption behavior according to sociodemographic factors. Structured interviews were conducted in the selected communities, where the questionnaire was applied to volunteer participants. The collected data were processed using the structural equation model (SEM), allowing analysis of the relationships between variables and confirmation of hypotheses.

2.5. Statistical analysis

Statistical techniques used for data processing employed the structural equation model (SEM), a tool for studying explanatory relationships between various variables in non-experimental data. It is a methodology that combines factor analysis and multiple regression, adopting a confirmatory approach by proposing a conceptual model of relationships between variables of interest a priori, then testing how well the model fits the data (empirical test), aiming to confirm the researcher's hypotheses about how constructs influence each other. The data were processed using the AMOS GRAPHICS software from SPSS version 23.0.

2.6. Ethical aspects

The ethical principles of scientific research were rigorously followed, ensuring both the confidentiality and anonymity of the participants. The study was approved by the Vice Presidency of Research of the Fabiola Salazar Leguia National Intercultural University of Bagua, Peru.

3. Results and discussion

3.1. Results

Table 1 represents the descriptive statistics of the interviewed inhabitants from native communities in the district of Aramango, Bagua. Of these, 55% were female, with the most representative age group being 25-39 years old (32%), followed by the 16-24 years group with 27%. A large percentage were cohabiting or married, with 41% and 33%, respectively. In terms of education level, 81% had primary or secondary education, with 8% having no formal education. Regarding their personal economic income, 65% earned less than 650 soles per month, with 22% having no income at all. Additionally, 75% had between 1 and 6 children, with 17% having 7 or more children. 57% of the interviewees belonged to the Tutumberos community, and 94% of them stated that they owned their own house.

Table 1. Descriptive analysis of the sociodemographic factors of indigenous communities

Variable	Categories	Percentage
Gender	Male	45%
	Female	55%
Age group	16-24 years old	27%
	25-39 years old	32%
	40-54 years old	21%
	55-64 years old	16%
	Older than 64 years old	4%
Marital status	Married	33%
	Single	14%
	Widower	7%
	Divorced	5%
	Cohabiting	41%
Level of education	Elementary	48%
	High school	33%
	Higher level	12%
	Without formal studies	8%
Personal income	Less than 650 soles	65%
	650-1025 soles	6%
	1026-2500 soles	4%
	2501-3000 soles	3%
	No personal income	22%

Variable	Categories	Percentage
Number of children	None	8%
	1-3 children	45%
	4-6 children	30%
	7 or more children	17%
Community	Najem	9%
	Tsuntsuntsa	32%
	Shawi	1%
	Alto Numpatkaim	1%
	Tutumberos	57%
Household	Own	94%
	Rent	6%

Note: Results obtained from the questionnaire applied.

Figure 2 represents the statistical validation construct of the structure of latent variables FAC-PRO-AMB, ICCS, and COMP-C-S through confirmatory factor analysis (CFA). This analysis aims to measure the covariance among latent variables, thus ensuring the adequacy of the proposed model. The latent variables are composed of FAC-PRO-AMB (pro-environmental factors), which represents factors related to pro-environmental attitude; ICCS (intention of sustainable consumption behavior), reflecting the willingness and intention to adopt sustainable consumption behaviors; and COMP-C-S (sustainable consumption behavior), which measures behavioral patterns regarding sustainable consumption.

The diagram shows the covariances among the latent variables, indicating how they are interconnected in the proposed model; it also displays the estimated indices and their variances explained by the factor and its indicator. The statistical validation focuses on ensuring that these covariances are consistent and support the proposed theoretical structure.

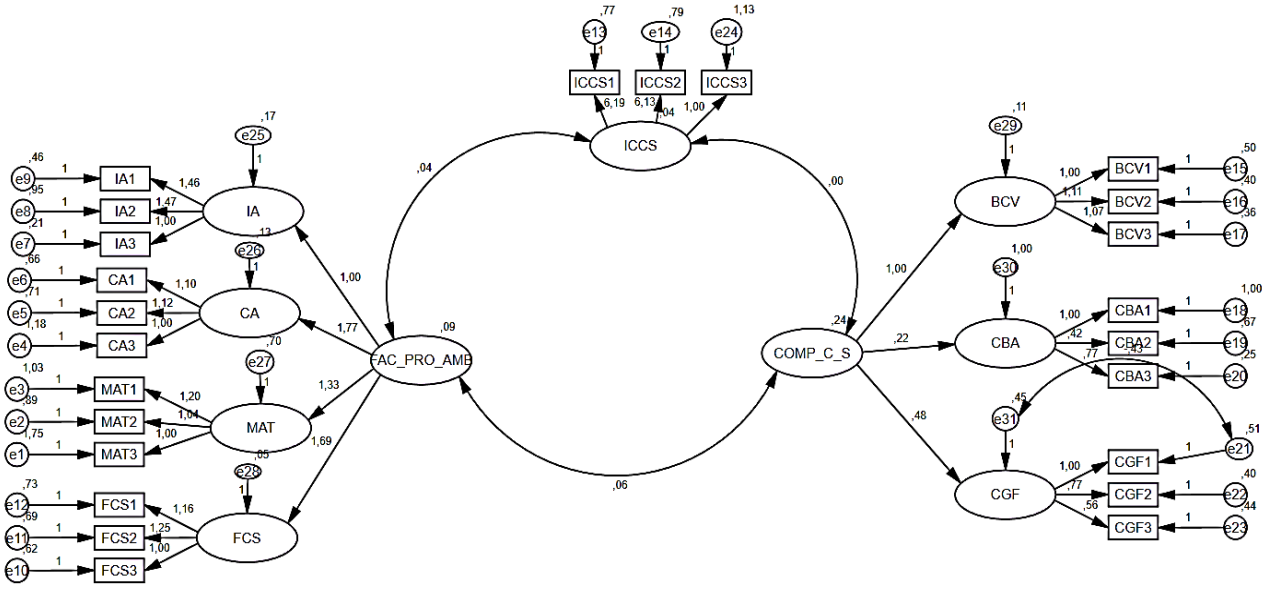

Figure 1. Statistical validation construct of the structure of latent variables FAC-PRO-AMB, ICCS, COMP-C-S (Confirmatory factor analysis)

Note: ICCS: Intention of Sustainable Consumption Behavior; FAC_PRO_AMB: Pro-Environmental Factors; COMP_C_S: Sustainable Consumption Behavior; IA: Environmental Influences; CA: Environmental Knowledge; MAT: Materialism; FCS: Promotion of Sustainable Consumption; BCV: Quality of Life Well-being; CBA: Environmental Well-being Care; CGF: Care for Future Generations.

The estimates show that the latent variables load significantly onto their items (Table 2); with $p<0.05$, confirming the structure among the latent variables; the covariances are significant and confirmed, indicating that a structural analysis can indeed be carried out to explain the intention of sustainable behavior.

Table 2. Confirmatory factor analysis: discriminant validity among the constructs to ensure the assessment of the significance of the relationship between variables

Regression weights: (Group number 1 - Default model)						
Relations			Estimate	S.E.	C.R.	P
IA	<---	FAC_PRO_AMB	1			
CA	<---	FAC_PRO_AMB	1,752	0,443	3,952	***
MAT	<---	FAC_PRO_AMB	1,313	0,413	3,184	0,001
FCS	<---	FAC_PRO_AMB	1,673	0,388	4,316	***
BCV	<---	COMP_C_S	1			
CBA	<---	COMP_C_S	0,172	0,078	2,2	0,028
CGF	<---	COMP_C_S	0,589	0,18	3,272	0,001
MAT3	<---	MAT	1			
MAT2	<---	MAT	1,041	0,18	5,774	***
MAT1	<---	MAT	1,192	0,207	5,759	***
CA3	<---	CA	1			
CA2	<---	CA	1,123	0,226	4,963	***
CA1	<---	CA	1,098	0,221	4,973	***
IA3	<---	IA	1			
IA2	<---	IA	1,475	0,231	6,371	***
IA1	<---	IA	1,452	0,21	6,93	***
FCS3	<---	FCS	1			
FCS2	<---	FCS	1,25	0,222	5,627	***
FCS1	<---	FCS	1,129	0,211	5,363	***
ICCS1	<---	ICCS	6,222	2,882	2,159	0,031
ICCS2	<---	ICCS	6,209	2,876	2,159	0,031
BCV1	<---	BCV	1			
BCV2	<---	BCV	1,105	0,168	6,584	***
BCV3	<---	BCV	1,089	0,164	6,632	***
CBA1	<---	CBA	1			
CBA2	<---	CBA	1,74	0,638	2,728	0,006
CBA3	<---	CBA	1,932	0,701	2,757	0,006
CGF1	<---	CGF	1			
CGF2	<---	CGF	0,577	0,158	3,662	***
CGF3	<---	CGF	0,358	0,108	3,325	***
ICCS3	<---	ICCS	1			

Note: FAC_PRO_AMB: Pro-Environmental Factors; COMP_C_S: Sustainable Consumption Behavior; MAT: Materialism; CA: Environmental Knowledge; IA: Environmental Influences; FCS: Promotion of Sustainable Consumption; ICCS: Intention of Sustainable Consumption Behavior; BCV: Quality of Life Well-being; CBA: Environmental Well-being Care; CGF: Care for Future Generations.

Figure 2 represents the modeling of hypothetical structural relationships among the constructs ICCS, COMP_C_S, and FAC_PRO_AMB, to justify the data collected in the study. This modeling involves converting a sequence diagram into a set of structural equations and measurement model specifications, as well as the statistical validation of the relationships between the endogenous variables (ICCS, COMP_C_S) and the exogenous variables (FAC_PRO_AMB and ICCS), as observed below.

The exogenous variables (FAC_PRO_AMB and ICCS) are those that are not affected by other variables in the model, while the endogenous variables (ICCS and COMP_C_S) are those influenced by other variables in the model. This distinction is crucial to understanding the direction of the proposed relationships.

The construct displays the hypothetical causal relationships proposed between the variables ICCS (intention of sustainable consumption behavior), COMP_C_S (sustainable consumption behavior), and FAC_PRO_AMB (pro-environmental factors). These relationships formulate hypotheses about the influence of pro-environmental factors on intention and sustainable behavior. The behavior of the endogenous variable ICCS is positively influenced by the exogenous variable FAC_PRO_AMB, as shown in the diagram. However, the endogenous variable COMP_C_S is influenced by the exogenous variable FAC_PRO_AMB but not significantly influenced by the ICCS variable.

The development of a theory-based model leads to constructing a sequence diagram of causal relationships, which is converted into a set of structural equations and measurement model specifications. This is a systematic approach to translating sequential interactions into a mathematical model. The causal analysis emphasizes that the effect is significant for evaluating the quality criteria for model fit, meaning that it involves verifying the relevance and significance of the proposed relationships, which is essential for validating the robustness of the model.

The presence of environmental and social variables like IA (Environmental Influences), CA (Environmental Knowledge), MAT (Materialism), FCS (Promotion of Sustainable Consumption), BCV (Quality of Life), CBA (Care of Environmental Welfare), and CGF (Care of Future Generations) suggests that the model considers relevant environmental and social factors in forming sustainable intention and behavior.

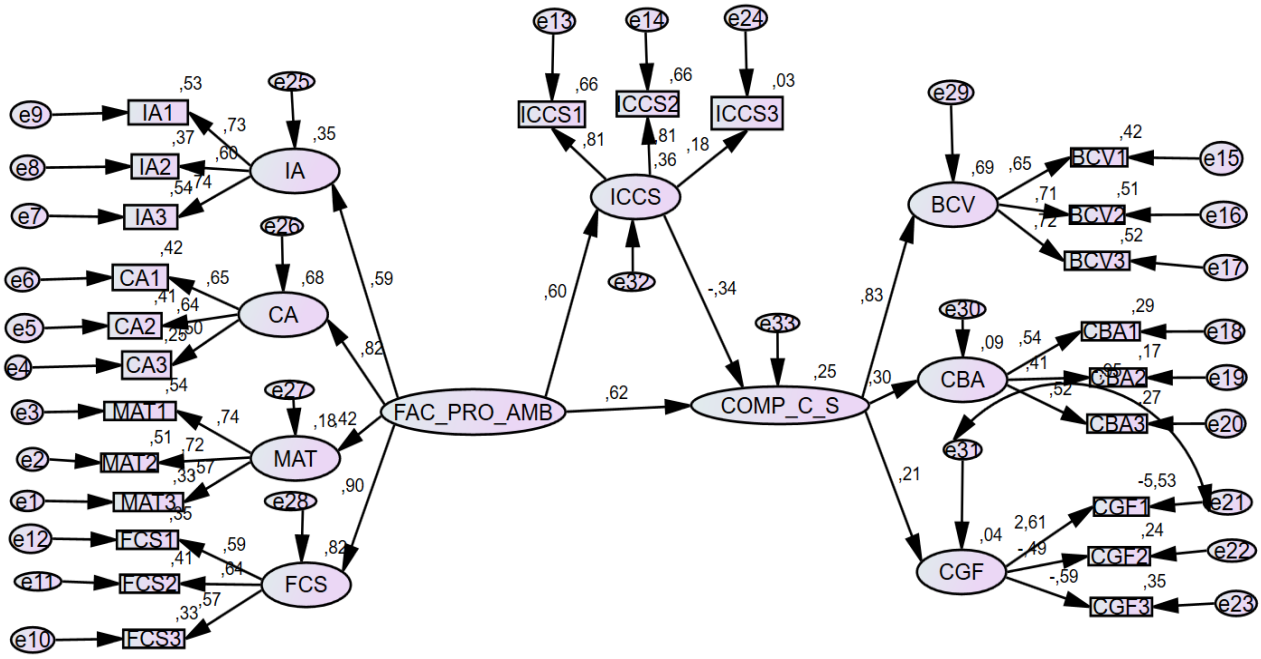

Figure 2. Modeling hypothetical structural relationships among constructs (ICCS, COMP_C_S, AC_PRO_AMB) for data justification

Note: ICCS: Intention of Sustainable Consumption Behavior; FAC_PRO_AMB: Pro-Environmental Factors; COMP_C_S: Sustainable Consumption Behavior; IA: Environmental Influences; CA: Environmental Knowledge; MAT: Materialism; FCS: Promotion of Sustainable Consumption; BCV: Quality of Life Well-being; CBA: Environmental Well-being Care; CGF: Care for Future Generations.

Table 3 presents the results of the analysis of the complete structural model of the study variables, focusing on the discriminant validity among the constructs to evaluate the significance of the relationships between the variables. The relationship between ICCS and FAC_PRO_AMB is significant (standardized regression = 0.600 and p = 0.044), indicating a moderate association between the intention for sustainable behavior and pro-environmental factors. The relationship between COMP_C_S and ICCS is not significant (standardized regression = -0.343 and p = 0.13), meaning there's no association between the intention for sustainable consumption behavior and sustainable consumption behavior. The relationship between FAC_PRO_AMB and

COMP_C_S is significant (standardized regression = 0.618 and p= 0.004), indicating a positive relationship between pro-environmental factors and sustainable consumption behavior.

The pro-environmental factors (FAC_PRO_AMB) variable has significant relationships ($p < 0.05$) with environmental knowledge (CA), materialism (MAT), and promotion of sustainable consumption (FCS); similarly, the sustainable consumption behavior (COMP_C_S) variable has significant relationships with quality of life (BCV) (standardized regression = 0.83) and care for future generations (CGF) (standardized regression = 0.208 and p= 0.003), suggesting that concern for caring for future generations is significantly associated with sustainable behavior. However, it is not related to environmental welfare (CBA) (standardized regression = 0.303 and p= 0.067).

The relationships between the sub-dimensions of each latent variable are significant, indicating respective probabilities of ($p < 0.05$), such as materialism (MAT), environmental knowledge (CA), environmental influences (IA), and promotion of sustainable consumption (FCS) among the pro-environmental factors; the ICCS1 and ICCS2 items from the intention for sustainable consumption behavior variable; and BCV1, BCV2, and BCV3 from the sustainable consumption behavior variable, demonstrating discriminant validity among their constructs.

In summary, Table 3 provides the structural analysis of the hypothetical relationships formulated in the set of equations, highlighting those that are significant and contribute to understanding the underlying dynamics among the study variables.

Table 3. Complete structural analysis (FULL SEM) for modeling hypothetical structural relationships among constructs (ICCS, COMP_C_S, AC_PRO_AMB) for data justification

Relations			Estimate	S.E.	C.R.	p
ICCS	<---	FAC_PRO_AMB	0,405	0,204	1,987	0,047
COMP_C_S	<---	ICCS	-0,844	0,556	-1,516	0,13
COMP_C_S	<---	FAC_PRO_AMB	1,026	0,356	2,884	0,004
IA	<---	FAC_PRO_AMB	1			
CA	<---	FAC_PRO_AMB	1,746	0,443	3,941	***
MAT	<---	FAC_PRO_AMB	1,318	0,414	3,184	0,001
FCS	<---	FAC_PRO_AMB	1,68	0,39	4,303	***
BCV	<---	COMP_C_S	1			
CBA	<---	COMP_C_S	0,123	0,067	1,832	0,067
CGF	<---	COMP_C_S	0,433	0,147	2,934	0,003
MAT3	<---	MAT	1			
MAT2	<---	MAT	1,043	0,181	5,77	***
MAT1	<---	MAT	1,194	0,207	5,755	***
CA3	<---	CA	1			
CA2	<---	CA	1,118	0,226	4,949	***
CA1	<---	CA	1,1	0,221	4,967	***
IA3	<---	IA	1			
IA2	<---	IA	1,472	0,231	6,363	***
IA1	<---	IA	1,453	0,21	6,928	***
FCS3	<---	FCS	1			
FCS2	<---	FCS	1,258	0,224	5,603	***
FCS1	<---	FCS	1,149	0,214	5,372	***
ICCS1	<---	ICCS	6,166	2,829	2,18	0,029
ICCS2	<---	ICCS	6,144	2,819	2,18	0,029
BCV1	<---	BCV	1			

Relations			Estimate	S.E.	C.R.	p
BCV2	<---	BCV	1,097	0,166	6,618	***
BCV3	<---	BCV	1,063	0,16	6,638	***
CBA1	<---	CBA	1			
CBA2	<---	CBA	1,817	0,675	2,692	0,007
CBA3	<---	CBA	1,969	0,74	2,661	0,008
CGF1	<---	CGF	1			
CGF2	<---	CGF	-0,4	0,146	-2,736	0,006
CGF3	<---	CGF	-0,453	0,158	-2,861	0,004
ICCS3	<---	ICCS	1			

Note: ICCS: Intention of Sustainable Consumption Behavior; FAC_PRO_AMB: Pro-Environmental Factors; COMP_C_S: Sustainable Consumption Behavior; IA: Environmental Influences; CA: Environmental Knowledge; MAT: Materialism; FCS: Promotion of Sustainable Consumption; BCV: Quality of Life Well-being; CBA: Environmental Well-being Care; CGF: Care for Future Generations.

Table 4 presents the hypotheses formulated in this study, which constitute the central focus of the research. The corresponding decisions and conclusions are based on the results obtained through the proposed structural analysis model. For Hypothesis 1, with a standardized regression of 0.600 and a p-value of 0.047, it is decided to reject the null hypothesis (Ho), suggesting a significant relationship between the variables studied. Consequently, it is concluded that the pro-environmental factors (FAC-PRO-AMB) are related to the intention of sustainable consumption behavior (ICCS).

In the case of Hypothesis 2, with a standardized regression of -0.343 and a p-value of 0.13, it is decided not to reject the null hypothesis, which implies that there is insufficient evidence to confirm a significant relationship between ICCS and sustainable consumption behavior (COMP-C-S). Likewise, for Hypothesis 3, with a standardized regression of 0.618 and a p-value of 0.004, the null hypothesis is rejected, indicating a significant relationship between the variables. Thus, it is concluded that pro-environmental factors are significantly related to sustainable consumption behavior.

The fit of the structural model was evaluated using several key indicators. The CMIN/DF index reached a value of 2.072, suggesting an acceptable relationship between the model and the data. The goodness-of-fit index (GFI) was 0.813, which, being close to 1, indicates a good fit. Similarly, the following values were obtained for other indicators: TLI = 0.701; RFI = 0.548; IFI = 0.701; and NFI = 0.602. Although some of these values do not reach the desired threshold, together they provide a reasonable model fit. In addition, the RMSEA value was 0.079, falling below the threshold of 0.10, suggesting an adequate fit.

In summary, the results of the structural model support the hypotheses, showing significant relationships between environmental factors and sustainable consumption behavior intention, as well as between environmental factors and sustainable consumption behavior. However, insufficient evidence was found to establish a significant relationship between ICCS and COMP-C-S. The fit indicators suggest that the proposed model is a reasonable fit to the observed data.

Table 4. Statistical hypothesis formulation for latent variables in the structural model

Hypothetical relationships	Standardized Estimates	p	Reported hypotheses
Ho: There is no positive relationship between FAC-PRO-AMB and ICCS. H1: There is a positive relationship between FAC-PRO-AMB and ICCS.	0,600	0.047	H0 is rejected There is significance
Ho: There is no positive relationship between ICCS and COMP-C-S. H2: There is a positive relationship between ICCS and COMP-C-S.	-0.343	0.130	H0 is accepted No significance
Ho: There is no positive relationship between FAC-PRO-AMB and COMP-C-S	0,618	0.004	H0 is rejected

Hypothetical relationships	Standardized Estimates	p	Reported hypotheses
H3: here is a positive relationship between FAC-PRO-AMB and COMP-C-S			There is significance
CMIN/DF= 2.072, GFI= 0.813, TLI= 0.701, RFI= 0.548; IFI=.745; NFI= 0.602; y un RMSEA= 0.079 < 0.10			

Note: ICCS: Intention of Sustainable Consumption Behavior; FAC-PRO-AMB: Pro-Environmental Factors; COMP-C-S: Sustainable Consumption Behavior.

3.2. Discussion

This research addresses the evaluation of sustainable consumption behavior in Indigenous communities, focusing on sociodemographic factors as key elements for understanding the dynamics of responsible consumption. The study, conducted by Figueroa-García et al. [24] emphasizes the importance of considering the particularities of indigenous communities when analyzing their consumption patterns, recognizing the cultural diversity and sociodemographic influences that can affect such behaviors.

In this context, the findings confirm that sustainable consumption behavior in Indigenous communities is influenced by sociodemographic factors. These results find evidence in the study by Estradé et al. [25], which found that psychosocial factors were associated with diet quality among Native Americans, suggesting the use of sociocognitive intervention approaches in these communities. Likewise, external factors such as government action, social pressure, and social environmental influences were identified as determinants of sustainable behavior [24]. Environmental knowledge and materialism significantly affected the intention for sustainable consumption behavior, which in turn influenced sustainable consumption behavior [2]. Consumers' food purchasing behaviors that support sustainability were driven by three underlying dimensions: economic security, environment, and nutrition [26]. Similarly, lifestyle has a significant and positive relationship with various dimensions of sustainable consumption behavior, such as reuse, healthy nutrition, environmental awareness, and saving behavior [27], [28]. Sociodemographic characteristics like gender, age, education, income, and occupation influence both lifestyle and sustainable consumption behaviors.

The change in community attitudes towards more sustainable practices may be related to the influence of younger generations, who are more exposed to formal education and digital media, which generates a greater openness towards modernization. In this regard, studies indicate that young people are highly aware of environmental issues and many of them want to adopt sustainable consumption habits [29]. Tailored educational initiatives in formal education and digital media to which younger people are exposed can improve understanding of sustainability, leading to more responsible consumption patterns [30], [31].

On the other hand, research highlights differences in the factors influencing green purchasing intentions between Generation Y and Generation Z, with the latter being more affected by environmental knowledge and social norms [31]. As such, although younger generations are often seen as sustainability advocates, it remains difficult to translate awareness into consistent behavioral change across all demographic groups, indicating that broader societal engagement is needed to make a lasting impact [32].

Moreover, this research has yielded significant results when examining the relationship between pro-environmental factors (FAC-PRO-AMB) and the intention for sustainable consumption behavior (ICCS) in Indigenous communities, as well as its connection with the promotion of sustainable consumption (FCS). From the perspective of pro-environmental factors, the results support previous research by Figueroa-García et al. [24], who argue that sustainable behavior can be explained by environmental influences, education, and market conditions. The positive relationship observed suggests that in Indigenous communities, environmental awareness and willingness to act accordingly are key factors in shaping ICCS.

Similarly, the findings highlight that pro-environmental factors are closely related to the intention for sustainable consumption. Previous research has demonstrated that individuals' value priorities, such as selfish and altruistic values, social consumption motivation, and pro-environmental self-identity, play an important role

in shaping their intention to engage in sustainable consumption [33], [34], [35]. Additionally, attitudes toward sustainability and susceptibility to social influence also affect consumers' intentions to engage in sustainable consumption, especially in the context of the fashion industry [36], [37], [38]. Moreover, it has been found that knowledge, habits, and cultural factors affect pro-environmental behavior and intention, emphasizing the need to consider these factors when promoting sustainable consumption [39].

On the other hand, the findings suggest that pro-environmental factors (FAC-PRO-AMB) are related to the promotion of sustainable consumption (FCS). The positive association found reinforces the idea that the drive toward sustainable consumption is strengthened by a pro-environmental predisposition in these communities [10]. Studies show that social consumption motivation and environmental awareness have a positive influence on pro-environmental self-identity, attitude, and sustainable consumption behavior [5], [33], [40]. Additionally, perceived behavioral control and self-efficacy play a crucial role in individuals' willingness to adopt pro-environmental behavior [41]. Social media campaigns can also increase interaction with pro-environmental content, leading to pro-environmental consumption behavior [42]. In general, understanding and promoting pro-environmental factors like values, motivation, awareness, and control can foster sustainable consumption behavior and contribute to environmental protection efforts.

Nevertheless, it is crucial to highlight the lack of statistical significance in the relationship between the intention for sustainable consumption behavior (ICCS) and sustainable consumption behavior (CCS). This finding aligns with research by Dimitrova et al. [2], suggesting that intention does not always translate directly into sustainable behaviors. Here, there is an opportunity for further research to explore the link that exists between intention and concrete action in the specific context of Indigenous communities.

In this regard, the lack of statistical significance in the relationship between ICCS and CCS may be attributed to several factors. One possible factor is the influence of emotions on behavioral intentions. Research by Atmoko et al. [43] suggests that intentions reinforced by emotions are more likely to translate into actual behavior. Another factor could be differences in temporal perception. Thus also, long-term perception was found to be a predictor of sustainable consumption behaviors, whereas short-term thinking may not have a significant relationship with such behaviors [44]. In addition, the context in which consumption behavior occurs may have an impact. On the other hand, motives associated with purchase intentions were found to differ between consumption contexts (e.g., on vacation versus at home) [45]. Finally, the perceived price of sustainable products may also affect the relationship between intention and behavior [46]. These factors highlight the complexity of the relationship between intention and behavior in sustainable consumption.

Likewise, another possible factor is the presence of a gap between intention and behavior, where individuals might have positive intentions but fail to make actual purchases [35], [47]. This intention-behavior gap can be influenced by several mediating factors, such as strategies for justifying unethical behaviors [43]. Additionally, attitudes toward eco-friendly products and environmentally friendly purchasing behavior may be mediated by the intention to buy eco-friendly products [48]. Emotions also play a role in strengthening the relationship between behavioral purchase intentions and actual purchasing behavior for eco-friendly products [49]. In addition, the intention to purchase green products may be influenced by factors such as subjective norms, perceived control over behavior, and level of environmental knowledge. Overall, the lack of a relationship between intention and behavior in sustainable consumption can be attributed to various psychological, social, and contextual factors.

3.3. Research limitations

Restricted access to Indigenous communities due to the distance and geography of their location required long trips and extensive foot journeys. However, most obstacles were overcome through partnerships with community leaders and local mediators to facilitate access. Moreover, language and cultural barriers might have hampered communication, though most of the population is bilingual, and the survey was translated into both

languages. There is also a risk of bias in self-reported survey responses, addressed with specific techniques and research methods.

3.4. Areas for future research

Since this research focuses on indigenous communities, it is imperative to conduct additional studies to better understand the specific dynamics of these populations. Future research could delve into the relationship between connection to the land and sustainable consumption practices, as well as explore the effectiveness of different pedagogical approaches in specific cultural settings. Incorporating mixed methods that combine quantitative and qualitative analyses could provide a more comprehensive view of attitudes and behaviors toward sustainability in Indigenous communities. Additionally, it would be beneficial to investigate the evolution of attitudes and behaviors over time, allowing for a deeper understanding of changing dynamics.

4. Conclusions

A detailed analysis of the results reveals a clear conclusion regarding the first objective of the research. It is confirmed, consistent with the existing literature, that pro-environmental factors are positively related to the intention of sustainable consumption behavior in Indigenous communities. This finding underscores the importance of environmental awareness and the predisposition to adopt pro-environmental practices as key elements in shaping the intention for sustainable consumption.

The second conclusion highlights the positive relationship between pro-environmental factors and the promotion of sustainable consumption in indigenous communities. This correlation supports the premise that environmental awareness and the willingness to act pro-environmentally contribute directly to the drive for sustainable practices. These results emphasize the need for intervention strategies that strengthen the connection between environmental awareness and the promotion of sustainable consumption in these communities.

Likewise, the research reveals a lack of statistical significance in the relationship between the intention for sustainable consumption behavior (ICSB) and sustainable consumption behavior (SCB) in Indigenous communities. This result, supported by previous studies, suggests that intention does not always translate directly into concrete actions. This conclusion underscores the complexity of the process from the formation of intentions to the effective implementation of sustainable practices, identifying an opportunity for future research to explore the barriers that may exist between intention and action.

Finally, it is concluded that sociodemographic characteristics such as gender, age, education, income, and occupation influence both lifestyle and sustainable consumption behavior. These results provide a comprehensive perspective that can guide policies and programs aimed at promoting sustainable practices, considering the diverse dimensions of the population.

Author contributions

Conceptualization, G.A.-A. and E.G.E.-A.; methodology, G.A.-A. and J.A.B.-Q.; software, G.A.-A. and M.A.M.-C.; validation, E.G.E.-A., G.J.C.-V. and Y.A.Q.-M.; formal analysis, G.A.-A. and E.G.E.-A.; investigation, C.A.C.D., J.R.P.-E and J.A.C.-R.; resources, J.A.B.-Q. and M.A.M.-C.; data curation, G.J.C.-V. and Y.A.Q.-M.; writing—original draft preparation, G.A.-A. and E.G.E.-A.; writing—review and editing, G.A.-A.; visualization, G.A.-A. and J.A.B.-Q.; supervision, J.A.B.-Q. and M.A.M.-C.; project administration, G.J.C.-V. and Y.A.Q.-M.; funding acquisition, G.A.-A. All authors have read and agreed to the published version of the manuscript.

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Ethical approval statement

The research did not require ethical approval to be conducted.

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