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Cultural contrasts in vegan food choice: A multi-methods comparative analysis of consumption values in Portugal and India

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ABSTRACT

This study examines the impact of consumption values on vegan food purchase intentions through a cross-cultural comparison between India and Portugal, two culturally distinct countries with divergent food traditions and value systems. Using the Theory of Consumption Values (TCV) as the framework, we analyze how functional, emotional, social, epistemic, conditional, and ecological values impact vegan purchasing decisions. We utilize both Partial Least Squares Multigroup Analysis (PLS-MGA) and Necessary Condition Analysis (NCA) on 394 responses collected via self-administered surveys.

Results show significant differences across countries: Indian consumers are primarily influenced by functional price, conditional, and emotional values, while Portuguese consumers tend to rely more on epistemic and functional quality. Notably, ecological value appears as a key predictor in both contexts. NCA results indicate that several values—particularly ecological, conditional, and functional price—are necessary (but not sufficient) for vegan food purchase intention. These findings challenge the TCV's assumption of additive and interchangeable value contributions, highlighting the importance of necessity-based reasoning in consumption choices.

This study contributes theoretically by expanding TCV with ecological value and methodologically by incorporating NCA. Practically, it provides actionable insights for marketers seeking to promote vegan consumption in culturally diverse markets.

1. Introduction

The world has been witnessing a rise in individuals consuming only vegan foods. Studies estimated that vegans comprise 79 million, the equivalent of 1 % of the world's population (Anthony, 2021), with the global vegan food market valued at nearly 25 billion USD in 2023 and projected to grow to $103 billion by 2032 (Fortune, 2025).

Globally, India leads in vegetarianism (40 %) due partly to religion (Radnitz et al., 2015). Portugal, despite its seafood focus, is witnessing a rise in plant-based diets (12 % vegan) driven by younger generations (nearly 17 % flexitarian/vegan/vegetarian) (Statista, 2023). Despite the rise in veganism (Ruby, 2012), academic studies on vegan food purchase decision-making remain scarce, particularly in cross-cultural contexts, although consumption values may differ, making a cross-cultural study compelling. Comparing vegan food purchase intentions in India and Portugal is fascinating due to their contrasting traditional diets.

Prior research suggests different motivations for choosing vegan food (Bryant et al., 2022). Ecological concerns (animal welfare, environment) (Dyett et al., 2013; Larsson et al., 2003), health benefits (Barnard et al., 2005; Craig, 2009), positive emotions (Janssen et al., 2016; Waldmann et al., 2003), social influence (Larsson et al., 2003; Povey et al., 2001), and curiosity (Bhattacharyya et al., 2023; Ribeiro et al., 2022) are among the most relevant.

Despite growing global interest in vegan food consumption, four key

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research gaps limit our understanding of consumer decision-making in this area. While studies identify various motivations for vegan food consumption, most rely on descriptive approaches or use frameworks like the Theory of Planned Behavior (Fishbein and Ajzen, 1975) and the Value-Attitude-Behavior Theory (Homer and Kahle, 1988), which have limitations (Sniehotta et al., 2014; Miller, 2017), as these frameworks lack a multidimensional perspective on values. The Theory of Consumption Values (TCV), which provides a comprehensive, multidimensional value framework, remains largely untested in the context of vegan food. Existing TCV applications range from mobile apps (Chakraborty et al., 2022; Chakraborty et al., 2022a,b), mainly focusing on organic foods (Prakash et al., 2018) or general green products (Lin and Huang, 2012), leaving vegan food consumption relatively unexplored. In this context, instead of just confirming TCV's applicability, we examine whether its core assumptions about additive value contributions are valid across different cultural contexts of sustainable consumption, thus addressing the gap in necessity-based studies that identify the values needed for intention and challenging the idea of pure additivity.

Furthermore, we identify a gap related to the lack of explicit treatment of ecological value as a separate consumption value within TCV for vegan foods. Therefore, we theorize and test Ecological Value as a distinct value to close this gap.

The final gap concerns limited cross-cultural evidence comparing different food cultures. Despite global trends toward plant-based diets, the meanings and motivations behind vegan food choices are deeply rooted in cultural contexts. Existing research on sustainable food consumption mainly uses single-country studies, with few cross-cultural comparative analyses (Bhattacharyya et al., 2023). Current studies assume that consumption value frameworks operate universally, without examining whether value hierarchies and relationships differ across cultural contexts. This is especially problematic because food values and consumption patterns are deeply rooted in culture (Ge and Kim, 2009).

Choosing India and Portugal offers a compelling case for cross-cultural contrasts in food-related value orientations. India, with deep-rooted traditions of plant-based diets influenced by religion, social customs, and spiritual beliefs (Fischer, 2023), offers a cultural setting where plant-based eating is common and often motivated by practical or economic reasons (Prakash et al., 2018; Pant et al., 2024). On the other hand, Portugal is a Western European country where meat and seafood are still key parts of the diet, and veganism is a fairly new trend, often discussed in terms of ethical or ecological values and personal curiosity (Graça et al., 2015; Gonçalves et al., 2016). These distinctions suggest that consumption values may function differently: functional and conditional values might be more prominent in India, whereas epistemic and ecological values could influence behavior more in Portugal. Prior studies emphasize that value priorities are culturally dependent (Ge and Kim, 2009; Giacalone and Jaeger, 2023). These cultural differences likely shape how individuals evaluate vegan food through various value lenses. By examining TCV in this context (Sheth et al., 1991), the research seeks to answer the question: How do different consumption values affect vegan food purchase intentions in these contrasting markets?

By applying the TCV, this study makes a significant contribution to the literature as one of the few studies exploring the application of theory in this field. Using a dual analytical approach (PLS-SEM + NCA) to test both sufficiency and necessity relationships among consumption values, this study identifies boundary conditions for TCV's additive logic assumption, revealing that some values function as necessary rather than substitutable conditions.

2. Theoretical setting

2.1. Vegan food and the consumption-value theory

Vegan food excludes all ingredients of animal origin and is often evaluated by consumers based on multiple benefits and trade-offs, such as health, taste, cost, convenience, identity, and ecological impact (D'Souza, 2022). Therefore, vegan food choice represents a complex decision that goes beyond simple functional considerations. Various factors influence vegan food purchase intentions, including ethical considerations, health concerns, environmental issues, emotional, social, and knowledge-seeking motivations (Lehto et al., 2023; Lin and Huang, 2012). Ethical and animal welfare concerns are among the strongest motivators, but gender also plays a role, with women more likely to consume vegan foods than men.

Traditional consumer behavior frameworks often fail to capture this multidimensional nature. The Theory of Planned Behavior (TPB) mainly emphasizes attitudes, subjective norms, and perceived behavioral control but does not distinguish between different types of underlying values that influence attitudes (Miller, 2017; Sniehotta et al., 2014). While acknowledging the role of values, the Value-Attitude-Behavior hierarchy framework treats values as unidimensional constructs rather than recognizing the multiple types of values that influence food choices at the same time (Homer and Kahle, 1988). TCV addresses these limitations by recognizing that consumers evaluate products across multiple value dimensions simultaneously. Moreover, since vegan choices are multi-attribute and culturally rooted, a multi-dimensional value framework is necessary. This approach is essential because functional factors (such as health benefits and price) often spark initial interest that triggers emotional reactions (like guilt reduction and self-satisfaction), some of which relate to ecological concerns (including environmental impact and animal welfare), providing moral justifications to maintain motivation.

Since no single-dimension theory can fully capture this complexity, TCV's multidimensional framework is theoretically appropriate for vegan food research. TCV is well-suited because it models distinct value facets, allowing testing of their unique contributions. We further argue that ecological value should be treated separately in vegan contexts, and some values may act as minimum requirements (necessity) rather than just additive drivers. This leads us to adopt a paired sufficiency-and-necessity approach.

2.2. Theory of Consumption Values

Recent research highlights the importance of different consumption values when choosing vegan food (Bhattacharyya et al., 2023; Kushwah et al., 2019; Onwezen et al., 2021). The Theory of Consumption Values (TCV) proposed by Sheth et al. (1991) views the consumer's perceived value as a multidimensional concept. It explains how different consumption values influence consumer preferences and buying decisions. Consumers' perceived product value guides actions, attitudes, judgments, and comparisons between specific objects and situations (Long and Schiffman, 2000; Zeithaml, 1988). By considering functional, emotional, social, epistemic, and conditional aspects, the TCV provides greater predictive ability. The TCV presents three core axioms: first, consumer behavior is shaped by multiple consumption values; second, these values vary in their contribution across different contexts and operate independently; third, all values can affect a purchase decision, each contributing uniquely and additively in specific situations. The current study challenges the assumption of additive logic by questioning the ideas of additivity and interchangeability, and identifying which values are essential for purchasing vegan products.

Moreover, while the Theory of Consumption Values suggests that multiple values influence consumer choices, it does not fully explain how cultural norms can enhance or diminish specific value dimensions. For instance, emotional or epistemic values may serve different roles in collectivist versus individualist societies, or in contexts where veganism is either common or niche. This study investigates how these values appear differently across various cultural groups. In vegan food contexts, we advocate for expanding our value system to include Ecological Value as a separate concept that captures environmental and animal welfare concerns, which cannot be reduced to functional quality/price

or emotional reaction.

In addition to additive sufficiency, consumption values may also serve as constraints: some values might need to surpass a minimum level before intention forms. We therefore combine partial least squares estimation of sufficient effects with a necessity-based test that identifies essential value thresholds. This dual approach allows us to ask not only which values boost intention, but also which values are necessary (i.e., without which intention does not develop).

2.2.1. Functional value

Functional value works through cost-benefit assessments where consumers decide if a product's practical benefits justify its costs. In the context of vegan food, this evaluation happens along two key dimensions: quality (how useful the product is in meeting customer goals) and price (the value gained from both immediate and future costs) (Sweeney and Soutar, 2001).

Previous studies applying the TCV in food have highlighted nutritional value (quality) and price as key elements of functional value (Bhattacharyya et al., 2023; Kushwah et al., 2019; Prakash et al., 2018). The health benefits of vegan food have been thoroughly examined. Vegan diets have been associated with health improvements (Dyett et al., 2013), including maintaining BMI (Spencer et al., 2003; Tonstad et al., 2009), lowering cholesterol (Craig, 2009; Dinu et al., 2017), reducing blood pressure (López et al., 2019; Pettersen et al., 2012), and decreasing the risk of cardiovascular disease (Spencer et al., 2003).

Research shows that perceived health benefits are the main motivators for adopting a plant-based diet (Craig, 2009; Dyett et al., 2013). However, the importance of quality considerations varies across cultures: health-conscious societies might focus on nutritional optimization, while societies with existing plant-based traditions may take health benefits for granted. Biswas and Roy (2015) and Prakash et al. (2018) found that Indian consumers prioritize quality when buying organic foods. In Portugal, quality has been shown to positively influence the intention to purchase green products (Gonçalves et al., 2016; Luzio and Lemke, 2013). Based on these findings, we hypothesize that:

H1. Functional value quality positively influences the purchase intention of vegan foods.

Price evaluation involves comparing immediate costs with perceived long-term value and has been shown to be positively associated with sustainable consumption (Tsay, 2010). Consumers are increasingly willing to pay higher prices for eco-friendly products (Eriksson, 2004; Laroche et al., 2001).

Cultural differences influence price sensitivity. Price-sensitive markets (India) might need competitive pricing for adoption, while wealthier markets (Portugal) may accept premium prices for perceived benefits. Studies in India (Prakash et al., 2018) and Portugal (Gonçalves et al., 2016) support a positive connection between price perception and the intention to buy vegan food. However, some studies indicate that functional value (such as price and quality) might not always affect sustainable consumption (Kushwah et al., 2019; Lin and Huang, 2012). Hence, we propose:

H2. Functional value price positively influences the purchase intention of vegan foods.

2.2.2. Emotional value

Emotional value, reflecting feelings like happiness and joy shaped by personal experiences, influences purchase decisions (MacKay, 1999; Sheth et al., 1991). It functions through affective evaluation systems where consuming a product produces positive emotional states. Research has shown that it positively affects ethical consumption (Bei and Simpson, 1995; Janssen et al., 2016) and the adoption of green products (Lin and Huang, 2012; Yuan et al., 2022). Bhattacharyya et al. (2023) found that emotional value predicts vegan food purchase intention and that positive emotions enhance self-esteem (Costa et al., 2019).

The emotional value of vegan food may originate from ethical and environmental concerns (Bei and Simpson, 1995), which are relevant to vegetarians and flexitarians (Cliceri et al., 2018). Studies in India (Kushwah et al., 2019; Biswas and Roy, 2015) and Portugal (Coelho et al., 2017; Gonçalves et al., 2016) found a positive relationship between emotions toward ethical and green products and purchase intention.

Emotional value should predict purchase intentions when vegan food consumption aligns with consumers' moral values and produces positive emotional responses. This link is likely to be stronger in cultures where plant-based eating conflicts with traditional dietary habits, leading to a greater emotional reward for adopting such a diet. Building on this, we hypothesize:

H3. Emotional value positively influences the purchase intention of vegan foods.

2.2.3. Social value

Social value, tied to self-image and social identity, arises when a product provides extrinsic benefits like social approval and status (Sweeney and Soutar, 2001). Social value operates through social identity and impression management processes, including group identification, status communication, and value expression.

Studies have shown that social relations influence food choices (Povey et al., 2001), impacting the adoption of veganism (Larsson et al., 2003; Williams et al., 2023). Studies in India (Biswas and Roy, 2015) highlight the influence of social value on the purchase of green products. In Europe, a cross-cultural study found that Portuguese consumers experience significant social pressure influencing their green product purchase intentions compared to other Europeans (Liobikienė et al., 2016).

Social value should predict purchase intention when vegan food consumption enhances social standing or group acceptance. However, this relationship may be weaker in contexts where veganism carries social stigma or is viewed as extreme behavior. Thus, we hypothesize:

H4. Social value positively influences the purchase intention of vegan foods.

2.2.4. Epistemic value

Epistemic value refers to the value derived from pursuing knowledge and experiences motivated by personal curiosity. It operates through curiosity, satisfaction, and knowledge acquisition processes, specifically the desire to explore new tastes, textures, preparations, learn about ingredients, preparation methods, health effects, and develop expertise in plant-based nutrition and cooking. Previous research highlights the importance of curiosity in consumer decision-making regarding sustainable foods (Rahnama and Rajabpour, 2017). Lin and Huang (2012) and Davitt et al. (2021) show a positive link between epistemic value and plant-based meat alternatives.

Societies that value culinary exploration tend to exhibit higher epistemic motivation, while traditional food cultures with established food patterns may show less curiosity about alternatives. In India, epistemic value is shown to drive organic food purchase intentions (Biswas and Roy, 2015; Kushwah et al., 2019). Similarly to India, Gonçalves et al. (2016) observed a positive link between epistemic value and vegan food, while a comparison between Portugal and Norway (Ribeiro et al., 2022) shows that consumers interested in exploring new food experiences are more willing to try friendly meat substitutes.

Epistemic value should predict purchase intention when vegan foods are new experiences for consumers. This link is expected to be stronger in cultures where vegan foods differ greatly from traditional dietary patterns. Therefore, we propose:

H5. Epistemic value positively influences the purchase intention of vegan foods.

2.2.5. Conditional value

The conditional value reflects the perceived utility of a product or service in specific circumstances, such as time, place, context, and personal traits (Belk, 1974; Laaksonen, 1993), functioning through evaluation of situational constraints (e.g., availability, opportunity, appropriateness of the setting). This study defines conditional value as the net benefit of vegan food, emphasizing the perceived personal advantages that encourage consumption.

Evidence indicates that conditional value positively affects purchase intention for organic foods (Lin and Huang, 2012), organic yogurt (Rahnama and Rajabpour, 2017), and plant-based meat alternatives (Bhattacharyya et al., 2023). Prakash et al. (2018) found that consumers in India are especially sensitive to prices, discounts, and promotional offers. In Portugal, Gonçalves et al. (2016) found that conditional value significantly influences green product purchases.

The conditional value should predict purchase intention when situational factors encourage vegan food consumption. This link is expected to be stronger in price-sensitive markets and where vegan food options are scarce. Therefore, this study hypothesizes:

H6. Conditional value positively influences the purchase intention of vegan foods.

2.2.6. Ecological value

Ecological value reflects the perceived importance of environmental issues, including harm assessment, moral obligation, and consideration of future impacts. We decided to add ecological value to the TCV because of its importance in sustainable consumption (Rahnama and Rajabpour, 2017; Sirieix et al., 2011). Ethical and environmental concerns are major reasons for adopting sustainable foods, including vegan options (Janssen et al., 2016). Consumers often associate ecological value with purchasing products they believe help preserve the environment (Straughan and Roberts, 1999).

Environmental concerns become a priority after basic needs are met, which aligns with Portuguese trends, ranking highly in the adoption of vegan foods (Graça et al., 2019). Religious or spiritual ties to nature may also shape ecological concerns. Studies in India show that a strong appreciation for nature connection increases the likelihood of buying vegan foods (Kautish et al., 2024; Shah and Thanki, 2024). Ecological value should influence purchase intention when consumers associate vegan food consumption with environmental protection and animal welfare. This link should be more pronounced in cultures with a high level of environmental awareness. Therefore, we propose:

H7. Ecological value positively influences the purchase intention of vegan foods.

2.3. Country-based differences: comparative hypotheses

While the Theory of Consumption Values (TCV) claims broad applicability across cultures, growing research indicates that the importance and relevance of specific consumption values differ depending on the cultural context (Ge and Kim, 2009; Oyedele and Simpson, 2018). Based on our review of Portuguese and Indian food consumption cultures and the results of previous studies (Biswas and Roy, 2015; Graça et al., 2019), we believe that Indian consumers are more influenced by functional (price), conditional, and emotional values, aligning with utilitarian and collective motivations. Meanwhile, Portuguese consumers tend to be more motivated by epistemic, functional (quality), and ecological values, reflecting curiosity, health consciousness, and environmental concern. Therefore, we propose:

H8a. The effect of functional value (quality) on vegan food purchase intention is stronger in Portugal than in India.

H8b. The effect of functional value (price) on vegan food purchase intention is stronger in India than in Portugal.

H9. The effect of emotional value on vegan food purchase intention is stronger in India than in Portugal.

H10. The effect of social value on vegan food purchase intention is stronger in Portugal than in India.

H11. The effect of epistemic value on vegan food purchase intention is stronger in Portugal than in India.

H12. The effect of conditional value on vegan food purchase intention is stronger in India than in Portugal.

H13. The effect of ecological value on vegan food purchase intention is stronger in Portugal than in India.

Fig. 1 presents the conceptual model, which includes the seven hypotheses depicting the direct effects.

3. Methods

3.1. Data collection and sample

This study adopts a cross-sectional design, capturing consumer values and purchase intentions at a specific point in time. Data were collected through an online, self-administered survey, employing a convenience sampling approach. Participants were recruited via popular social media platforms (e.g., Facebook, Instagram, LinkedIn) to maximize reach and ensure exposure to a diverse group of individuals from India and Portugal with some familiarity with vegan foods. Eligibility criteria included living in Portugal or India, being at least 18 years old, and having basic familiarity with vegan foods. Informed consent was obtained electronically before the survey was completed, following ethical research standards.

A total of 394 valid responses were obtained for analysis (243 Indian, 151 Portuguese). Although small, the final sample size exceeded established thresholds for partial least squares structural equation modeling (PLS-SEM), thereby supporting the adequacy and robustness of the analyses.

The Indian sample comprised 52.3 % men and 47.3 % women, with 55.6 % aged 15–30 and 25.5 % aged 31–45. Most held a master's degree (50.2 %), were employed (43.6 %), and had household incomes

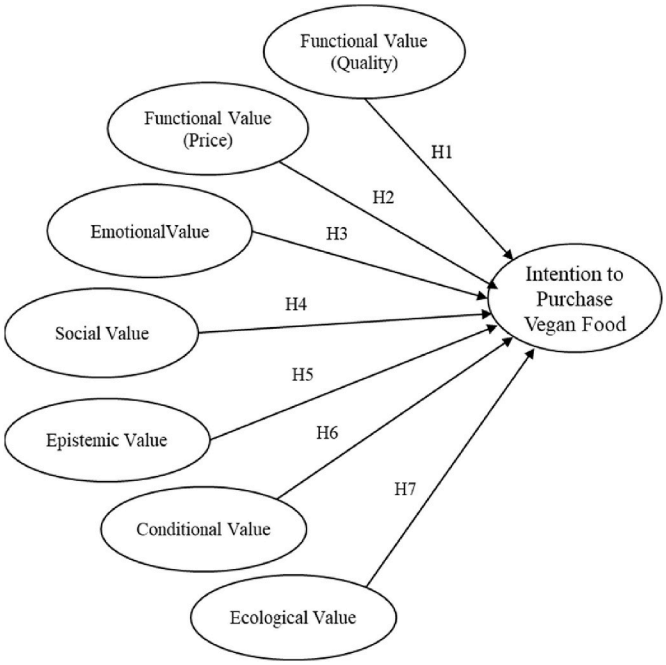

Fig. 1. – Conceptual model.

exceeding 3500€ (approximately 3 Lakh Indian Rupees) (25.5 %). Similarly, the Portuguese sample predominantly included women (55.6 %) and individuals aged 15–30 (70.2 %), with varied household income distributions and educational backgrounds.

3.2. Survey development and measures

Previously validated scales were employed to gather data. For Functional Value Quality (FVQ), Functional Value Price (FVP), and Epistemic Value (EpV), we use Choe and Kim (2018); for Emotional Value (EV) and Social Value (SV) we use Sweeney and Soutar (2001), for Conditional Value (CV) we use Lin and Huang (2012), for Ecological Value (EcV) we use Chen and Chang (2012), and for Purchase Intention (PI) we use Kushwah et al. (2019) (Table 1). Items were randomized within blocks to minimize consistency artefacts, and wording emphasized that there were no right/wrong answers to reduce evaluation apprehension.

3.3. Analysis

The TCV posits that consumption values contribute additively to choice decisions, with consumers able to trade off lower levels of one value for higher levels of another (Sheth et al., 1991). This assumption has received limited empirical scrutiny. The theory's third axiom suggests that "all values can influence a purchase decision, each making a unique and additive contribution in specific situations." However, in sustainability-focused consumption contexts, some values may function as necessary conditions or threshold requirements that cannot be compensated for by other values, regardless of their levels.

To complement sufficiency-based estimates obtained with PLS-SEM via SmartPLS 4 (Ringle et al., 2024), we performed a necessity-based evaluation using Necessary Condition Analysis (NCA) (Dul, 2016) to

Table 1
Scales source, reliability, and internal validity.

Construct	Items	Source	Complete			India			Portugal		
			Loading	CR	AVE	Loading	CR	AVE	Loading	CR	AVE
Functional Value Quality (FVQ)	Vegan foods provide a variety of nutrition	Chloe and Kim (2018)	0.908	0.930	0.822	0.913	0.950	0.825	0.889	0.944	0.808
	Vegan foods make me healthy		0.926			0.937			0.897		
	Vegan foods have a high standard of quality and are safe		0.872			0.865			0.882		
	Vegan foods provide good nutrition		0.921			0.916			0.927		
Functional Value Price (FVP)	Overall, I think vegan foods are reasonably priced		0.933	0.903	0.892	0.973	0.956	0.916	0.865	0.908	0.832
	Overall, I think vegan foods offer value for money		0.955			0.976			0.957		
Emotional value (EV)	Eating vegan foods makes me want to eat it often	Sweeney and Soutar (2001)	0.907	0.956	0.878	0.912	0.969	0.886	0.889	0.959	0.853
	Eating vegan foods makes me feel good		0.929			0.38			0.904		
	Eating vegan foods gives me pleasure		0.965			0.965			0.960		
	Eating vegan foods is something I enjoy		0.947			0.947			0.941		
Social Value (SV)	Eating vegan foods would help me feel acceptable in a group		0.876	0.946	0.842	0.899	0.961	0.859	0.786	0.936	0.787
	Eating vegan foods would improve the way I am perceived		0.924			0.929			0.927		
	Eating vegan foods would enable me to make a good impression on other people		0.939			0.939			0.939		
	Eating vegan foods would give me social approval		0.930			0.940			0.889		
Epistemic Value (EpV)	I think that I want to try more diverse vegan foods	Chloe and Kim (2018)	0.890	0.927	0.819	0.881	0.950	0.825	0.900	0.944	0.807
	Overall, I think that I want to seek out more information about vegan foods		0.898			0.917			0.872		
	Overall, I think that eating vegan foods is a good opportunity for me to learn new things		0.896			0.900			0.889		
	Overall, I think that I am more curious about vegan foods		0.935			0.935			0.932		
Conditional Value (CV)	I would buy vegan foods instead of conventional foods when there is a subsidy for vegan foods	Lin and Huang (2012)	0.948	0.946	0.899	0.958	0.965	0.902	0.927	0.961	0.891
	I would buy vegan foods instead of conventional foods if offered at a discount or with other promotional incentives		0.953			0.951			0.954		
	I would buy vegan foods instead of conventional foods if they were easily available		0.945			0.940			0.951		
Ecological Value (EcV)	The environmental performance of vegan foods meets my expectations	Cheung and To (2019)	0.871	0.951	0.870	0.892	0.967	0.880	0.889	0.958	0.850
	I would purchase vegan foods because they are produced in a more environmentally concerned way as compared to other foods		0.952			0.954			0.904		
	I would purchase vegan foods because it has more environmental benefits than other products		0.954			0.965			0.960		
	I would purchase vegan foods because it is environmentally friendly		0.950			0.945			0.941		
Purchase Intention (PI)	I intend to consume vegan foods	Kushwah et al. (2019)	0.968	0.955	0.915	0.973	0.979	0.941	0.961	0.956	0.879
	I plan to consume vegan foods		0.972			0.976			0.967		
	I prefer Vegan foods to other foods		0.928			0.960			0.884		

determine whether specific values are essential conditions for intention—that is, without a minimum level of the value, intention cannot occur. This directly tests TCV's assumption about additive effects in vegan foods. If certain consumption values are found to be necessary rather than simply additive, it would establish a key boundary for TCV's broader use, indicating that theoretical adjustments are needed in sustainability consumption scenarios.

The analytical approach serves a dual purpose: PLS-SEM tests TCV's traditional sufficiency-based relationships, while NCA examines whether certain values function as necessary conditions. This methodological triangulation allows us to distinguish between values that increase purchase intention (sufficiency) and values that must be present for intention to occur (necessity). Such analysis can reveal whether TCV's additive logic assumptions require modification in sustainable consumption contexts.

To compare the results for India and Portugal, the multi-group analysis (MGA-PLS) was performed.

4. Results

4.1. Evaluation of the measurement model

The measurement model was evaluated to assess the reliability and accuracy of the scales. Hair et al.'s (2019) guidelines were followed to evaluate reflective measures (outer loadings, composite reliability, AVE (Table 1), and Heterotrait-Monotrait Ratio (HTMT) (Table 2). All outer loadings and composite reliability values are above 0.708, and the AVE is above 0.5. Similarly, all HTMT ratios are below 0.85, indicating that the model has discriminant validity. The measurement model is considered adequate since all values fall within acceptable ranges.

4.2. Structural model

After establishing the reliability and validity of the measurement model, we proceeded to evaluate the structural model. Diagnostic checks addressed potential multicollinearity and common method bias. The results showed that all Variance Inflation Factors (VIFs) were well below the conservative cutoff of 5, indicating no concerns about multicollinearity. Additionally, exploratory factor analysis revealed that no single factor explained more than 50 % of the total variance, thus reducing the likelihood of common method bias.

The PLS-SEM results for the structural model show that consumption values have a significant capacity to predict vegan food purchase intention, accounting for 75.4 % of the variation in purchase intention in the Portuguese sample and 66.9 % in the Indian sample, indicating that the model has good explanatory power in both contexts. (Table 3). Fig. 2 displays the results of the conceptual model analysis for the entire sample.

According to the results in Table 3 on the significance of individual values between Portugal and India, only two hypotheses are simultaneously supported in both countries (H1 and H7), confirming the positive effect of functional value (quality) (H1) and ecological value (H7) on the intention to purchase vegan food.

The multi-group analysis (PLS-MGA) with 10000 subsamples was used to test hypotheses H8 through H12. While the direction of the results aligns with our expectations, only the intergroup difference concerning conditional value (H12) reached statistical significance at $p < 0.05$. Despite a statistically significant difference in the path coefficient between the countries, the related hypothesis was only supported in the India sample. All other hypotheses were not statistically supported, although they reflect meaningful trends consistent with the NCA findings and cultural theory. Therefore, based on the PLS-MGA results, we conclude that the impact of the statistically significant hypotheses (H1 and H7) does not differ significantly between Portugal and India. (Table 3).

The findings show that only hypothesis H4 is not supported in both countries. In India, only two hypotheses are not supported (H4 and H5), while in Portugal, four hypotheses are not supported (H2, H3, H4, and H6) (Table 3).

4.3. NCA

We conducted an NCA analysis to determine whether any functional values were essential for predicting the purchase intention of vegan foods. Using the latent variables' scores estimated in PLS-SEM, the necessary conditions were examined separately in Portugal and India. The data were imported to the NCA package in R (Dul, 2024).

Following Dul et al. (2023), the first step is to present all the scatter plots of every bivariate relationship. In the case of India, only FVP, EcV, and CV present an empty space in the expected corner (Fig. 3). Regarding Portugal, only SV does not present an empty space in the expected corner (Fig. 4). These findings are also noticeable in the effect size.

To consider a condition as necessary, we follow Dul's (2016) size effect threshold of 0.1 and a p-value <0.05 (Table 6).

These results indicate that a certain level of conditional, ecological, and functional value pricing is necessary for a specific level of Indian consumers' intention to buy vegan food. (Table 4). Portuguese consumers are more demanding, requiring a minimum level of conditional value, ecological value, emotional value, epistemic value, and functional value in terms of price and quality before purchasing vegan food.

The next step is to evaluate the bottlenecks (Table 5). The results indicate that no specific conditions are necessary to achieve a purchase intention level below 30 %. To achieve a 30 % rate, an FVP of at least 1.191 for Indians and 1.249 for Portuguese is necessary. However, for Portuguese, the FVP level must be supplemented by minimal levels of FVQ and SV (Table 5). The results of the bottleneck analysis show that the Portuguese are more demanding, requiring specific consumption values to buy vegan foods. Functional (both quality and price) and social values are especially important.

Combining the PLS-SEM analysis with the NCA analysis, Table 6 shows that the Portuguese and the Indians exhibit different behaviors regarding the intention to purchase vegan food. While CV, EcV, and FVP are necessary conditions for Indians, only SV is not a necessary condition for the Portuguese.

Table 2
Discriminant validity – HTMT.

India									Portugal							
	CV	EV	EcV	EpV	FVP	FVQ	PI	SV	CV	EV	EcV	EpV	FVP	FVQ	PI	SV
CV																
EV	0.735								0.571							
EcV	0.764	0.786							0.597	0.703						
EpV	0.757	0.750	0.764						0.676	0.694	0.717					
FVP	0.392	0.652	0.581	0.479					0.083	0.419	0.322	0.258				
FVQ	0.681	0.761	0.777	0.712	0.693				0.496	0.780	0.742	0.665	0.392			
PI	0.740	0.769	0.757	0.713	0.579	0.733			0.579	0.800	0.818	0.777	0.417	0.819		
SV	0.435	0.560	0.479	0.503	0.401	0.475	0.446		0.231	0.301	0.350	0.265	0.149	0.233	0.278	

Table 3
– Hypotheses evaluation.

	Complete (R^2 = 67.5 %)				India (R^2 = 66.9 %)				Portugal (R^2 = 75.4 %)				MGA (India vs Portugal)		
Hypotheses	*β*	*t-stat.*	*p- values*	Results	*β*	*t-stat.*	*p- values*	Result	*β*	*t-stat.*	*p- values*	Result	Hyp.	Diff. (India - Portugal)	2-tailed *p*-value
(H1) FVQ - > PI	0.178	2.910	0.004	Supported*	0.132	1.691	0.091	Supported*	0.253	2.524	0.012	Supported*	H8a	−0.121	0.341
(H2) FVP - > PI	0.069	2.052	0.040	Supported*	0.107	2.184	0.029	Supported*	0.081	1.858	0.063	Not Supported	H8b	0.026	0.688
(H3) EV - > PI	0.213	3.579	0.000	Supported*	0.226	2.872	0.004	Supported*	0.200	1.957	0.050	Not Supported	H9	0.026	0.854
(H4) SV - > PI	0.013	0.350	0.728	Not Supported	−0.012	0.232	0.817	Not Supported	−0.008	0.201	0.840	Not Supported	H10	−0.004	0.950
(H5) EpV - > PI	0.142	2.264	0.024	Supported*	0.098	1.185	0.236	Not Supported	0.221	2.697	0.007	Supported*	H11	−0.123	0.290
(H6) CV - > PI	0.117	2.265	0.023	Supported*	0.249	3.807	0.000	Supported*	0.015	0.212	0.832	Not Supported	H12	0.234	0.019
(H7) EcV - > PI	0.243	4.272	0.000	Supported*	0.157	2.119	0.034	Supported*	0.281	3.579	0.000	Supported*	H13	−0.124	0.247

Note: Relationships significant at 0.05; β = Beta Coefficient.

Fig. 2. – Conceptual model results.

5. Discussion

Our findings call for careful reflection on TCV's core assumptions. The discovery that multiple values serve as necessary rather than additive conditions indicates that TCV may oversimplify the link between consumption values and choice behavior, especially in situations involving moral or sustainability considerations. The cultural differences in necessity patterns also suggest that TCV's presumed universality needs to be qualified. However, we recognize that while identifying these boundary conditions is theoretically important, it does not provide alternative mechanisms to replace TCV's additive logic.

The findings underscore the importance of cultural context in shaping value hierarchies in line with Ge and Kim (2009) and Oyedele and Simpson (2018). The significance of curiosity and ecological concern in Portugal contrasts sharply with the price- and condition-sensitivity seen in India, reflecting deeper cultural narratives around food, identity, and social norms. Although one of the cross-country hypotheses (H8–H12) was statistically supported via PLS-MGA analysis, the observed trends and necessity patterns in NCA reinforce the theoretical rationale for culturally specific value drivers. *Our findings* support *the dual logic proposed: several values show significant effects in PLS-SEM, while ecological value (across countries) and conditional/price (India) serve as essential thresholds, indicating that intention does not develop below certain value levels. This pattern refines TCV by demonstrating that, in vegan food contexts, values may function both as additive drivers and as constraints.*

Perceived health benefits (functional value quality) are essential for both Indian and Portuguese consumers when purchasing vegan food (H1 supported). This is especially true in Portugal, where quality and price matter (necessary conditions). Interestingly, Indians might have a baseline expectation of healthy qualities in vegan food due to their vegetarian heritage. This aligns with previous research on plant-based foods (Bhattacharyya et al., 2023) and sustainable consumption in both India (Pant et al., 2024; Prakash et al., 2018) and Portugal (Gonçalves et al., 2016).

As expected, the functional value price predicts vegan food purchases in the Indian sample (Bhattacharyya et al., 2023; Kushwah et al., 2019; Prakash et al., 2018). However, it did not have a similar effect on purchase intention in the Portuguese sample, supporting H2 partially. This result suggests that Indian consumers perceive vegan foods as

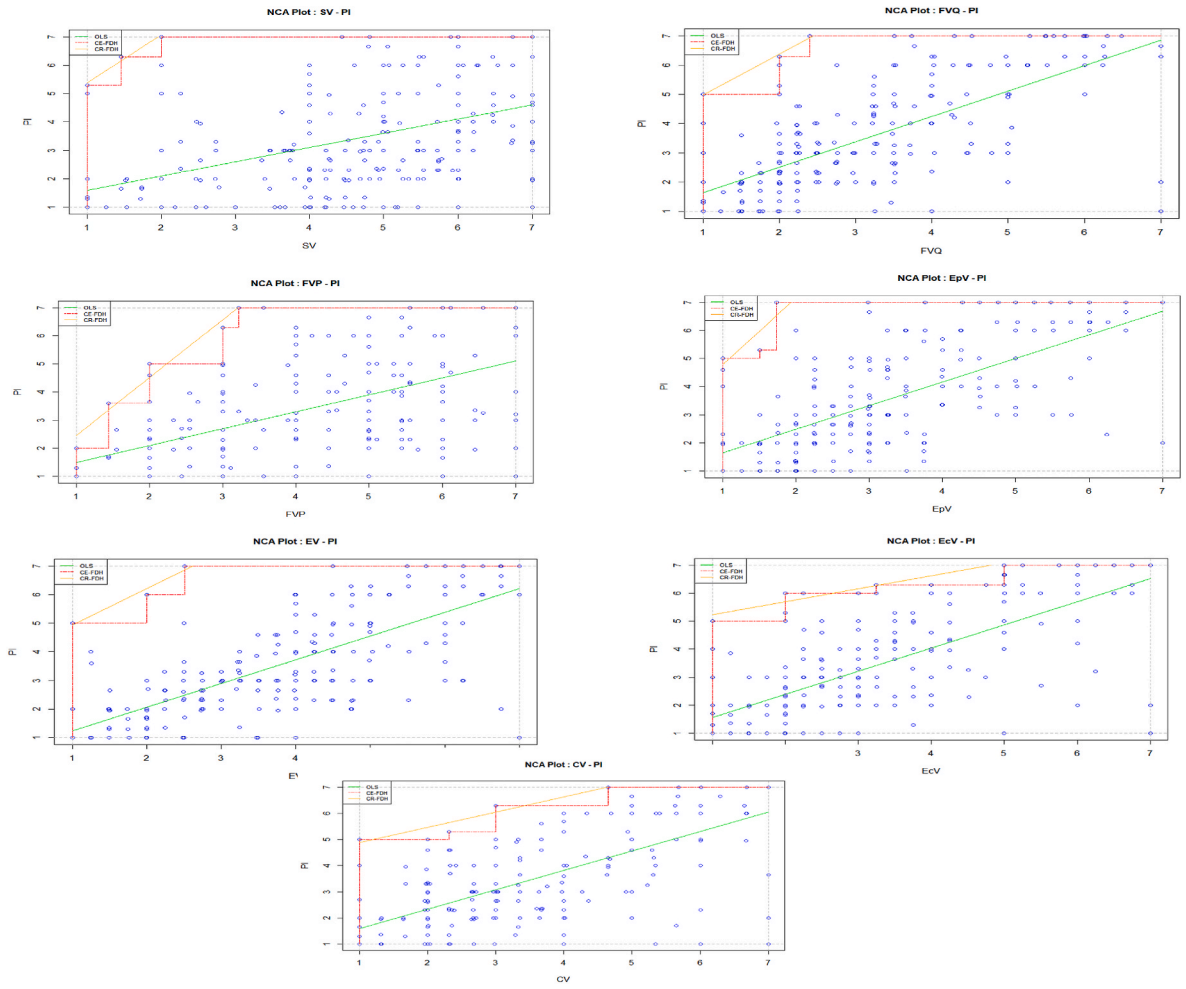

Fig. 3. Bivariate ceiling lines (India).

reasonably priced, positively influencing their buying decisions. This finding has been supported by studies on green products' ethical consumption in India (Biwas and Roy, 2015) and organic food (Prakash et al., 2018). However, it is essential to note that a functional value price threshold is needed for Portuguese and Indian consumers' purchase intention. This effect is not small (d = 0.17 for India; d = 0.22 for Portugal) and has a practical influence: if consumers do not feel that the price is reasonable, even if all the other characteristics are present, they will not purchase vegan food in any of the countries.

Emotional value is positively linked to the purchase intention of vegan foods in the Indian sample, partially supporting H3, suggesting that positive emotional reactions from consuming vegan foods influence the intention to purchase vegan products. Emotional value has the second-highest standardized beta among all other values for the Indian sample, making it one of the most important predictors of vegan food purchase intention. This finding supports the evidence of a positive link between emotional value and the intention to buy sustainable products in India (Kushwah et al., 2019; Biwas and Roy, 2015). In the Portuguese sample, emotional value is a necessary condition for the purchase intention of vegan food. Therefore, increasing emotional value does not directly increase purchase intention until it reaches a certain (minimum) level.

Social value does not affect the purchase intention of vegan foods for Indian and Portuguese samples, thus rejecting H4. Moreover, social value is not a necessary condition for purchase intention in both samples. Such a result might indicate that both Indian and Portuguese respondents felt that eating vegan foods does not affect their social status or social acceptance, and they would purchase vegan food, even in the absence of social acceptance. This finding differs from previous studies (Biwas and Roy, 2015; Khan and Mohsin, 2017), which suggest significant positive correlations between social value and sustainable food consumption. However, a similar result is also seen in Lin and Huang's study (2012), which shows that social value has no significant relationship with green product purchase intention.

Epistemic value predicts purchase intention in the Portuguese sample but not in the Indian sample, partially supporting H5. Additionally, epistemic value is also a necessary condition in the Portuguese sample, demonstrating its strong positive effect on vegan food purchase intention. This indicates that curiosity among Portuguese consumers is a vital value, and without curiosity, there is no intention to purchase vegan food. This evidence aligns with Gonçalves et al. (2016), indicating that epistemic value positively influences green product purchase behavior in Portugal, probably due to traditional Portuguese diets being meat-centric. Therefore, vegan foods might be seen as more unique and new, sparking curiosity among Portuguese consumers. In contrast, Indian consumers do not link such curiosity with buying vegan foods. Vegan foods may not be significantly different from traditional Indian dishes that include combinations of cereals, pulses, millets, legumes, vegetables, fruits, and spices (Platel, 2020).

Conditional value is the strongest predictor of vegan food purchase intention in India, and it had no direct linear effect on vegan food purchase intention in Portugal, partially supporting H6. In Portugal, consumers only show the intention to buy vegan food when some conditional value is present. However, an increase in the conditional

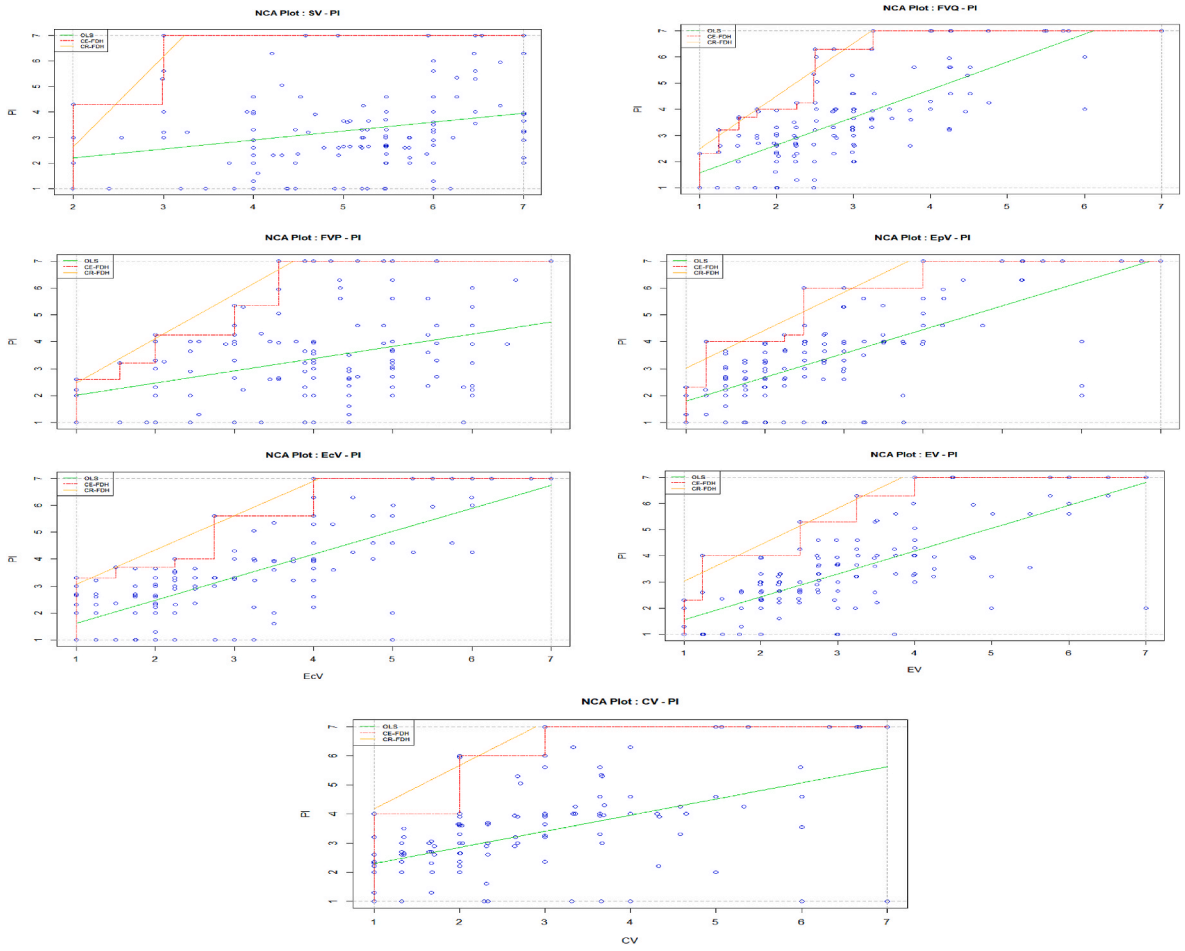

Fig. 4. Ceiling lines (Portugal).

Table 4
Effect size.

Dimension	India				Portugal			
	ce_fdh (d)	*p*-value	cr_fdh (d)	*p*-value	ce_fdh (d)	*p*-value	cr_fdh(d)	*p*-value
CV	0.14	0.00	0.11	0.00	0.11	0.00	0.07	0.00
EV	0.07		0.05		0.19	0.00	0.16	0.00
EcV	0.12	0.00	0.09	0.00	0.21	0.00	0.17	0.00
EpV	0.04		0.03		0.18	0.00	0.16	0.00
FVP	0.17	0.00	0.14	0.00	0.22	0.00	0.17	0.00
FVQ	0.06		0.04		0.16	0.00	0.14	0.00
SV	0.03		0.02		0.09		0.09	

Table 5
Bottlenecks.

PI (Y)		India							Portugal						
		CV	EcV	EV	EpV	FVP	FVQ	SV	CV	EcV	EV	EpV	FVP	FVQ	SV
0.0 %	1.000	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN
10.0 %	1.600	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN
20.0 %	2.200	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN
30.0 %	2.800	NN	NN	NN	NN	1.191	NN	NN	NN	NN	NN	NN	1.249	1.165	2.007
40.0 %	3.400	NN	NN	NN	NN	1.470	NN	NN	NN	1.265	1.273	1.273	1.614	1.460	2.174
50.0 %	4.000	NN	NN	NN	NN	1.749	NN	NN	NN	1.731	1.700	1.695	1.978	1.756	2.342
60.0 %	4.600	NN	NN	NN	NN	2.028	NN	NN	1.289	2.198	2.127	2.116	2.343	2.051	2.510
70.0 %	5.200	1.525	NN	1.211	1.177	2.307	1.156	NN	1.689	2.664	2.554	2.538	2.707	2.346	2.677
80.0 %	5.800	2.560	2.313	1.679	1.429	2.586	1.590	1.258	2.089	3.131	2.982	2.959	3.072	2.641	2.845
90.0 %	6.400	3.595	3.888	2.146	1.681	2.865	2.024	1.613	2.489	3.597	3.409	3.381	3.436	2.936	3.013
100.0 %	7.000	4.630	5.463	2.614	1.933	3.144	2.458	1.969	2.889	4.063	3.836	3.802	3.801	3.231	3.180

Table 6
– Necessary and sufficient values.

	India		Portugal	
	PLS-SEM	NCA	PLS-SEM	NCA
CV	Significant	Necessary	Not Significant	Necessary
EV	Significant	Not Necessary	Not Significant	Necessary
EcV	Significant	Necessary	Significant	Necessary
EpV	Not Significant	Not Necessary	Significant	Necessary
FVP	Significant	Necessary	Not Significant	Necessary
FVQ	Significant	Not Necessary	Significant	Necessary
SV	Not Significant	Not Necessary	Not Significant	Not Necessary

value does not increase purchase intention in India, even though previous research on sustainable food consumption indicates that conditional value is positively associated with purchase intention (Biwas and Roy, 2015; Prakash et al., 2018; Rahnama and Rajabpour, 2017). When vegan foods are on sale, Indian consumers are more likely to buy them. This highlights the price-conscious nature of Indian consumers, who see incentives as important to their decision-making process (Biwas and Roy, 2015; Prakash et al., 2018). However, this value is not a necessary condition, meaning that the lack of conditional value does not necessarily mean there is no intention to buy vegan food.

Ecological value is positively related to purchase intention in both countries, supporting H7. This value is one of the most important predictors of vegan food purchase intent among Portuguese consumers. This finding aligns with recent studies in Portugal (Graça et al., 2019), which suggest that environmental and animal concerns are main reasons for choosing plant-based foods. Ecological value has also been shown to encourage sustainable consumption behavior in India (Biswas and Roy, 2015). These results are even more noteworthy when combined with the NCA findings; ecological value is a necessary condition for both Portuguese and Indian samples, with a medium effect.

The differences between India and Portugal can be understood by looking at deeper cultural and market factors. In India, where plant-based diets have been part of religious and social traditions for a long time, vegan foods are often seen as familiar, which lowers their novelty (epistemic value) but increases practical concerns such as cost and availability. In contrast, in Portugal, veganism is a relatively new and non-traditional choice, often seen as an ethical lifestyle, which explains the stronger role of curiosity about knowledge and ecological identity. These results indicate that values are not just abstract ideas but are also shaped by historical dietary habits, cultural views of morality, and market conditions. Future research should use qualitative and ethnographic methods to better understand these contextual influences.

6. Conclusion

This study systematically filled important gaps in vegan food consumption research, making specific theoretical and methodological contributions. We successfully applied TCV to vegan food consumption for the first time, showing that this multidimensional framework explains 66.9 % (India) and 75.4 % (Portugal) of the variance in purchase intention. The inclusion of ecological value proves crucial, acting as a necessary condition in both cultural settings. This addresses the theoretical gap by offering a comprehensive, value-based framework for understanding vegan food choices.

Our comparative analysis shows that value necessity patterns vary greatly across cultures: Portuguese consumers require six different value thresholds, while Indian consumers require only three. This challenges the idea that consumption value frameworks work the same everywhere, adding cultural limits to TCV theory. Moreover, cultural contexts should be studied to better understand how cultural factors shape value necessity patterns, especially in emerging markets with diverse food traditions.

The dual PLS-SEM/NCA analytical approach reveals that TCV's additive logic assumption needs revision. Multiple values serve as necessary conditions that cannot be replaced by higher levels of other values. This methodological innovation highlights limitations in traditional sufficiency-based approaches to consumption values research. The necessity-sufficiency analytical approach should be used in other consumption contexts to see if additive logic limitations are specific to certain domains or point to broader theoretical issues. Future research should create frameworks that include both additive and necessary condition relationships among consumption values, possibly incorporating complexity theory or threshold models.

Despite the growing trend to adopt vegan diets, limited research has investigated the purchase intention of vegan foods, particularly focusing on the influence of consumption values, especially as theorized by the TCV. Additionally, there has been less research on cross-cultural comparisons, especially between two diverse countries with different food cultures. To address this gap, this study explores how different consumption values impact the purchase intention for vegan foods in India and Portugal, including a new consumption value related to ecological concerns.

6.1. Theoretical contributions

This study expands the existing literature on vegan foods, where current academic research remains limited (Ghaffari et al., 2021), responding to the call for more studies on sustainable food purchase intention (Bhattacharyya et al., 2023; Graça et al., 2019). It provides a general framework of vegan food purchase intention based on the TCV, which is new, as most studies focus on understanding the implications and motivations associated with vegan diet adoption (Ghaffari et al., 2021; Shah and Thanki, 2024).

The findings offer several theoretical contributions that refine rather than merely confirm TCV's applicability. We identify key boundary conditions for TCV's additive logic. Our NCA results show that TCV's third axiom does not hold universally. In both cultural contexts, certain consumption values act as necessary conditions and cannot be replaced by higher levels of other values, challenging the theory's assumption of perfect substitutability among consumption values.

The present study also addresses the lack of cross-cultural comparisons of sustainable foods (Bhattacharyya et al., 2023; Khan and Mohsin, 2017) by comparing India and Portugal, two countries with very different food cultures. By testing the differences between countries, this study expands the TCV's explanatory capacity but also highlights how culturally conditioned value structures influence vegan food intentions, even when statistical significance is not reached, as shown by necessity-based insights from NCA. Although TCV assumes broad cross-cultural applicability, our findings indicate that the necessity (not just importance) of specific values varies significantly between cultures. This suggests that TCV's assumptions about universal applicability should be refined to better reflect cultural differences in the structure of value necessity.

This theoretical extension is especially significant in cross-cultural food research, where norms, dietary customs, and moral views of food vary greatly between societies. By placing consumption values within cultural contexts, this study promotes a more detailed and globally relevant understanding of food choice behavior. By addressing two very distinct realities, this study provides a benchmark to sustainable food consumption studies conducted in Portugal (Bairrada et al., 2023; Pedro and Lemeke, 2013) and in India (Kushwah et al., 2019; Ghaffari et al., 2021).

Traditional consumption values research primarily uses sufficiency-based methods like regression and SEM that assume additive contributions of values. However, in cases involving moral or sustainability issues, certain values might act as necessary conditions rather than just adding to other factors, as demonstrated. No research has tested whether the core assumption of TCV—that values can be substituted—is true across different cultures. Thus, we highlight limitations in traditional

TCV testing methods. By integrating PLS-SEM with NCA, we show that standard sufficiency-focused techniques overlook important necessity relationships. Values may seem insignificant in regression analyses, but can actually be essential for forming intentions. This insight has important implications for future consumption values research.

Moreover, the study extends the TCV by incorporating ecological value as a new consumption value. It assesses its impact on vegan food purchase decisions, adding to the results from previous studies (Janssen et al., 2016; Radnitz et al., 2015), showing that ecological factors such as environmental preservation and animal welfare are important motivators for vegan food consumption. Regarding ecological value addition, we recognize this as a domain-specific expansion rather than a fundamental change in theory. The consistent necessity of this value across cultures highlights its importance for sustainability-related TCV applications.

These contributions constitute theoretical refinement and boundary condition identification. We identify when and how TCV assumptions break down, which enhances theoretical understanding while recognizing the limits of our theoretical advancement.

6.2. Managerial implications

The findings also provide actionable insights for businesses and policymakers. Understanding Indian and Portuguese consumer values can help vegan food marketers create targeted and effective marketing campaigns that attract more consumers and potentially increase sales. Our findings show that functional value, quality, and ecological value predict vegan foods in India and Portugal, with these being necessary conditions in Portugal. Thus, marketers of vegan food in both countries should focus on these values in their campaigns to influence consumer perceptions of vegan foods. For example, marketers could emphasize the long-term and short-term health benefits of vegan foods to showcase their functional value. The importance of highlighting functional and ecological value should be emphasized more strongly in Portugal, as they are also essential conditions.

Importantly, our findings indicate that value-based marketing must adapt to different cultures. In Portugal, where veganism is still growing, curiosity (epistemic value) and ethical/environmental identity (ecological value) are key motivators of behavior. Conversely, Indian consumers, coming from a background where plant-based diets are more common, respond more to economic incentives and emotional connections. Marketers should avoid assuming that certain value appeals work the same across all markets.

The quality and nutritional content of vegan foods must be ensured, and their ecological value should be communicated transparently and credibly. Emphasizing emotional value is especially crucial in India, as it significantly influences Indian consumers' intention to buy vegan foods. Indian consumers also appear to be more price-sensitive, as the perceived value related to price impacts their purchase decisions. However, they are essential conditions for both markets. Therefore, vegan food companies should ensure that price levels remain appropriate. Additionally, marketers should emphasize vegan food's unique characteristics and qualities to attract consumer interest in Portugal.

Social value did not influence vegan food purchase intention in either country; therefore, marketers should not highlight this value in their campaigns, but instead concentrate on personal satisfaction derived from other values that demonstrated a stronger effect.

Cultural sensitivity in vegan food marketing is more than just about tone; it is a strategic aspect. Matching product messaging with the core values of each cultural setting can boost relevance, build trust, and encourage adoption. For global brands, customizing value communication by country might be crucial for success.

Furthermore, demographic segmentation can further sharpen marketing strategies. For example, younger and urban consumers in Portugal might respond more strongly to epistemic and ecological appeals, while price-sensitive or rural consumers in India could be more receptive to conditional incentives and functional (price) messaging. Gender differences, with women often more involved in adopting sustainable foods, also indicate the need to tailor campaigns to highlight emotional and ethical benefits for female audiences.

The findings highlight different strategies for businesses and policymakers in each country. In India, where functional and conditional values are key, companies should focus on affordability, convenience, and situational promotions (e.g., discounts, loyalty programs, or bundling with main meals). Policymakers can further encourage adoption by subsidizing plant-based options and ensuring they are accessible in public institutions through initiatives that include price subsidies, tax benefits, or infrastructure for affordable vegan choices, which can be particularly effective in this context.

In Portugal, where epistemic and ecological values are more prominent, firms should therefore position vegan food products not merely as alternatives, but as part of a distinct lifestyle and cultural experience. Marketing strategies could highlight novelty, taste exploration, and personal identity expression, supported by experiential campaigns (e.g., cooking events, tasting sessions, or influencer partnerships). Premium pricing may be feasible when associated with ecological certifications or innovative offerings, while policymakers could boost adoption through eco-labeling schemes, awareness campaigns, and including vegan diets in national sustainability plans. Policymakers could complement these efforts by supporting educational campaigns that showcase both the cultural relevance and ecological benefits of plant-based diets, thereby reinforcing consumer curiosity and positive emotions toward vegan food.

6.3. Limitations and future research

Although the current study provides several important theoretical and practical contributions, it also has some limitations. The sample for each country is small and was collected through convenience sampling. Therefore, while the sample is suitable for statistical analysis, it may not capture the full diversity of the countries, especially in India, which restricts the generalizability of the results.

Although India and Portugal were chosen to represent different food cultures, both countries are internally diverse, and the study's design might not fully capture these internal differences, potentially oversimplifying cultural influences. The different cultural meanings could have affected how respondents interpreted survey questions, which might impact comparability. Therefore, the findings should be seen as suggestive rather than representative of the entire population. Future research should increase the sample size, use probability-based sampling methods, and include multiple countries to better understand intra- and inter-cultural differences in vegan food consumption.

Since veganism is a dynamic and evolving phenomenon, consumer motivations and value priorities may change. Longitudinal or panel studies would be helpful to track these shifts and see if the need patterns identified here remain consistent or vary over time.

Although validated measurement scales were used in both contexts, the study assumes measurement invariance across cultures. Future research should formally test full or partial measurement invariance to ensure that constructs like emotional or epistemic value are interpreted similarly across different cultural groups. Additionally, future research could examine the impact of moderating demographic variables, such as gender, which have been shown to significantly influence sustainable food purchase intentions, as suggested by Fantechi et al. (2024) and de Backer et al. (2020). Even though we collected demographic data for descriptive purposes, we did not include age, gender, socioeconomic status, or urban–rural residence as moderators of consumption values.

Prior research suggests that these factors significantly impact sustainable food consumption. Therefore, future studies could expand the TCV model by incorporating psychographic segmentation to examine whether the key drivers of vegan purchase intentions vary systematically across different consumer groups. It would also be valuable to

explore the role of mediating and moderating variables, such as consumer innovativeness (Biwas and Roy, 2015) or ecological concerns (Kushwah et al., 2019; Lin and Huang, 2012). While we identify important boundary conditions for TCV, our study does not propose alternative theoretical mechanisms to explain necessity-based value relationships. The addition of ecological value, though empirically supported, represents contextual expansion rather than theoretical innovation. Future research should develop theoretical frameworks that can accommodate both additive and necessary condition relationships among consumption values, potentially drawing from complexity theory or threshold models of decision-making.

CRediT authorship contribution statement

Paulo Duarte: Writing – review & editing, Writing – original draft, Visualization, Supervision, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Raquel Meneses:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Formal analysis, Data curation. **Susana C. Silva:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Conceptualization. **Riya Roy Tharakan:** Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Implications for gastronomy

The findings of this study have several implications for the field of gastronomy, especially at the intersection of culinary innovation, sustainability, and cross-cultural consumer behavior.

First, identifying functional quality and ecological value as key predictors of vegan food purchase intention in both India and Portugal suggests that gastronomic professionals (e.g., chefs, product developers, and educators) should emphasize health benefits and environmental responsibility when creating and promoting vegan dishes. Emphasizing these values on menus could boost their attractiveness and align with current trends in health, sustainability, and responsible sourcing.

Second, the observed cross-cultural differences indicate that Indian consumers are more responsive to price and emotional value appeals, whereas Portuguese consumers are more influenced by curiosity and ecological concerns. This highlights the need for culturally adapted culinary strategies. In India, affordable pricing and emotionally engaging stories can drive interest, whereas in Portugal, focusing on flavor innovation, unique ingredient combinations, and environmental benefits may be more effective.

Third, the results of the Necessary Condition Analysis indicate that certain values must reach a minimum level to trigger a purchase intention. For Indian consumers, functional price, conditional value, and ecological value emerged as necessary, whereas for Portuguese consumers, functional quality, functional price, emotional value, epistemic value, and ecological value were all required. From a gastronomic perspective, these results suggest that culinary innovation should prioritize meeting these baseline expectations in terms of taste, quality, sustainability, and experiential novelty before attempting to introduce more advanced or experimental gastronomic concepts.

Finally, the results challenge the additive assumption of the Theory of Consumption Values, showing that values are not interchangeable and that their influence depends on culture. This finding has direct implications for gastronomy research and practice, emphasizing the importance of incorporating cultural specificity into menu design, product development, and culinary education. Adopting a value-driven, context-responsive approach can support the development of gastronomic offerings that are both culturally meaningful and commercially successful.

Globally, these implications highlight the importance of adapting gastronomic practices to align with market trends and cultural sensitivities, focusing on meaningful, context-driven innovation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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