

Determinants of Consumer Perception and Adoption of Plant-Based Milk in India: A Covariance-Based Structural Equation Modeling Approach

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Received: 08-05-2025

Revised: 25-08-2025

Accepted: 04-09-2025

ABSTRACT

Purpose: The objective of the research work is to find out the factors that influence Indian consumers' perceptions and the adoption of plant-based milk. Through a wider application of the Theory of Planned Behavior (TPB), it discusses how health awareness, ethical issues, price sensitivity, social influence, and perceived behavioral control as factors, affect the attitudes of the people and their actual purchasing decisions. **Design/Methodology/Approach:** A cross-sectional survey of 263 Indian consumers in a wide age range of 18 to 55 years was conducted. Data was evaluated using covariance-based structural equation modeling (CB-SEM) with Jamovi 2.6.23 and IBM AMOS 24.0. Initially, the measurement model was tested for reliability and validity, and then the structural model was examined through path coefficients, significance levels, and model fit statistics. **Findings:** The measurement model was determined to be reliable, and it met the requirements of convergent and discriminant validity. The results of the structural model have shown that attitude has a significant and positive influence on buying behavior, thus confirming its central role in the process of decision-making. The ethical concern was the strongest positive predictor of attitude, and it was followed by perceived behavioural control as an attitude antecedent. Health consciousness and price sensitivity negatively affected attitude in a significant way, which may indicate consumer skepticism or difficulties in evaluating these attributes. Subjective norms did not play a significant role, thus indicating that the purchasing decisions are more affected by personal assessments than by social pressure. The findings, in general, suggest that personal values and perceived control are the two main determinants of consumers' buying behaviour. **Originality/Value:** This research can be considered as one of the very first attempts to thoroughly investigate the case of plant-based milk adoption in the Indian scenario through the application of CB-SEM, thereby providing empirical support for the extended TPB model. The conclusions drawn from the study are valuable not only for marketers but also for policymakers and the whole food industry seeking to facilitate the sustainable transformation of diets in the emerging markets.

Keywords: Plant-based milk, Consumer behaviour, Theory of Planned Behavior, CB-SEM, Sustainable consumption, Health consciousness, Ethics

How to cite this article: Nikhil, A.K. and Bhagat, V. (2025). Determinants of Consumer Perception and Adoption of Plant-Based Milk in India: A Covariance-Based Structural Equation Modeling Approach. *Agro Economist - An International Journal*, 12(03): 91-110.

Source of Support: None; **Conflict of Interest:** None



The global food system is currently challenged in an unprecedented manner by issues of sustainability, human health and resource limit. The livestock industry is one of the major sources of greenhouse gas emissions, water usage and land footprint, which has led to an increase in the demand for plant-based diets (Adel *et al.* 2021; Nagvanshi *et al.* 2025). Beverages made with plant-based milks - such as soy, almond, oat, and coconut - have not only gained acceptance as eco-friendly but also health-conscious and ethical products (Du & Jiang, 2025; Nakhonchaigul & Suwanmaneepong, 2024).

India, however, is a peculiar case when it comes to plant-based milk acceptance. It is the biggest milk producer and consumer in the world, yet, at the same time, it is having issues with the high rate of lactose intolerance among its population (60-70%), and the environmental impact of the dairy industry besides the fact that urban consumers are becoming more health-oriented (Braun, 2023; M. C. *et al.* 2021). The Indian plant-based milk market is expected to expand its speed of growth to a whopping 20.7% CAGR between 2023 and 2030, mainly due to urbanization, higher salaries along with changing tastes and preferences (Painuly *et al.* 2024). Nevertheless, the penetration rate of these products is still much lower as compared to that of western countries, thus, it is essential for marketers to fully comprehend the means of consumer perception and behavior.

The majority of the current research regarding the adoption of plant-based foods has been conducted in Western countries only, while the investigation in the Asian emerging markets is very scant (Jia *et al.* 2025; Qi *et al.* 2021). Different theoretical perspectives have been used for sustainable food consumption studies, including the Theory of Planned Behavior (TPB), which has proved to be a powerful predictor of diverse food contexts (Chen *et al.* 2024; Mustapa *et al.* 2024; Nguyen *et al.* 2019). Nonetheless, the TPB model's main dimensions such as attitude, subjective norm, and perceived behavioral control might not be able to process the intricacy of plant-based milk consumption in widely varied cultures like India.

This paper is going to fill up three significant research gaps. Firstly, even though there is a lot of market interest in it, there is no empirical research on plant-based milk adoption in India. Secondly,

the TPB has been applied to organic and sustainable food consumption in a very wide way (Dangelico *et al.* 2024; Fleşeriu *et al.* 2020; Mukhtar *et al.* 2024) but its application to plant-based milk specifically with the relevant context has been not so much. Thirdly, most of the existing researches have used partial least squares structural equation modeling (PLS-SEM) (Khayyam *et al.* 2021; Sharief & Rao, 2023; Skallerud *et al.* 2021), which is exploratory; however, very few studies have employed covariance-based SEM (CB-SEM), which allows more rigorous testing of theories and assessment of model fit (Khan *et al.* 2022; Nwobodo *et al.* 2024).

This research intends to enrich and put to the test through observation an extensive Theory of Planned Behavior (TPB) framework to clarify the acceptance of plant-based milk in India. It will do so by introducing supplementary determinants like health consciousness, moral concern, and price sensitivity. The study applies covariance-based structural equation modeling (CB-SEM) to analyze the attitude-behavior link and to produce solid and trustworthy empirical evidence. In this way, the study will be able to direct marketers, policymakers, and industry players through actionable insights, hence, making decision-making easier and supporting a gradual shift in India's diet towards a more sustainable and responsible pattern of consumption.

Significance of the Study

This study serves the dual purpose of developing the theory and practice further. From the theoretical aspect, it broadens the TPB by adding the factors related to the adoption of plant-based milk in the context of an emerging market, thus responding to the demand for the development of context-specific theory (Chan *et al.* 2025; Jin *et al.* 2020). On the methodological side, it applies CB-SEM which permits assessing measurement quality and model fit comprehensively, thus yielding more strict proof compared to exploratory methods (Shen *et al.* 2022). The implications of the research results extend to the offering of insights for the creation of targeted marketing strategies, product innovations, and policy interventions, thus supporting sustainable food consumption in India and other emerging markets similar to it.

LITERATURE REVIEW

Plant-Based Milk: Market Trends and Consumer Perspectives

The market in plant-based milk alternatives has seen an impressive growth pattern all over the world. The global plant milk market value saw a massive 8.6% CAGR during 2020-2024 and will further push up the market value from USD 21.9 billion to USD 52.3 billion as it will keep rising at a CAGR of 9.1% from 2025 through 2035. Soy milk leads the way in terms of product category, being responsible for 38.0% of the market share while the form sector class in liquid plant-based milk is the leading with a 63.0% share of the market (Future Market Insights, 2025). The process of producing plant milk includes a variety of source plants like soy, almond, oat, coconut, rice, and cashew, with every type of milk having unique properties (Mengistu, 2025; Nowson *et al.* 2025). The change from conventional to plant-based milk was justified by multiple reasons among which health problems (lactose intolerance, cholesterol, allergies), environmental issues (carbon footprint, water consumption), ethical debates (animal rights) and preference for taste were the most important ones (Ramsing *et al.* 2023).

In the Indian scenario, the acceptance of plant-based milk is accompanied by both difficulties and chances unique to the case. The Indian culture and cuisine have a very strong connection to dairy consumption, and milk is viewed as a main food and symbol of purity for many communities (Sen, 2004). Nonetheless, the gradual consumer preference shift is caused by urbanization, exposure to global food trends, and rising health consciousness (Alkhalidy, 2025). Different research works show that the Indian consumers are becoming more open to plant-based alternatives, especially among the young, educated, and urban populations (Basu *et al.* 2024; Sethi *et al.* 2016).

Several key determinants have been identified through research on the adoption of plant-based food. The driving force that is health awareness comes out on top, with customers looking for products that provide nutritional advantages, lower the risk of diseases, and help people live healthier lives (Su *et al.* 2025; Venter de Villiers *et al.* 2024).

Environmental sensitivity is another factor that influences significantly as consumers more and more understand the environmental footprints of the food they consume (Boaitey & Minegishi, 2020; Dangelico *et al.* 2024; Poore & Nemecek, 2018; Su *et al.* 2023). On the other side, taste, price, and knowledge barriers still exist and slow down the adoption process (Chalupa-Krebzdak *et al.* 2018; Mustapa *et al.* 2024; Nakhonchaigul & Suwanmaneepong, 2024).

Theoretical Frameworks in Sustainable Food Consumption

Ajzen's (1991) Theory of Planned Behaviour (TPB), has been suitably employed in different fields to forecast and comprehend consumer behaviour, including sustainable food consumption (Ajzen, 1991). TPB maintains that a person's intention to perform an action is determined by three key factors; the individual's attitude toward the behaviour (positive or negative), their subjective norm (beliefs about the support they will receive from their social circle) and their perceived behavioural control (their assessment of how hard or easy it will be to execute the action). Intention to act then becomes the most direct and of course the first determinant of actual behavior, provided the actor has enough control over the situation (Ajzen, 2002). The TPB model has been empirically validated in food consumption area by several studies. A meta-analysis of the studies by Shen *et al.* focusing on sustainable food consumption through 58 studies found out that attitude ($r = 0.52$), subjective norm ($r = 0.38$), and perceived behavioral control ($r = 0.41$) were the main predictors of purchase intention with the model justifying 54% of the variance in intention. But the authors pointed out that the studies showed a great deal of inconsistency, which called for context-specific extensions (Shen *et al.* 2022).

Researchers in some instances have tried to improve the Theory of Planned Behavior (TPB) by adding different constructs that are applicable to the specific consumption context. One of these new constructs is health consciousness which indicates the extent to which people are worried about their health and take part in health-promoting activities; it has been used in TPB models for organic food (Fleşeriu *et al.* 2020; Khan *et al.* 2022; Qi *et al.* 2021) and functional food consumption (Jia *et al.* 2025). It is always reported

that health consciousness has a favourable effect on both attitude and purchase intention (Braun, 2023; Chan *et al.* 2025; Khan *et al.* 2022). To do so, TPB has been modeled with environmental awareness and Ethical Concerns to show the link between industry and consumer in the hierarchy of environmental concern via the latter's acceptance of eco-friendly practices (Adel *et al.* 2021; Dangelico *et al.* 2024; Honkanen *et al.* 2006). Researchers have also taken into consideration other points of extension like product knowledge (Nguyen *et al.* 2019), trust (Khan *et al.* 2022), moral attitude (Qi *et al.* 2021), food safety concerns (Fleşeriu *et al.* 2020; M. C. *et al.* 2021), and past behaviour (Chen *et al.* 2024). The incorporation of such factors has on the whole resulted in the TPB gaining a larger explanatory power. In fact, among the extended models, the one that has the highest variance in purchase intention explaining is 60-80% whereas for the basic TPB it is only 40-55% (Fleşeriu *et al.* 2020; Jin *et al.* 2020; Mukhtar *et al.* 2024).

Determinants of Plant-Based Food Adoption

1. Health Consciousness

Many consumers consider plant-based milk to be a healthier alternative mainly because of its properties such as low cholesterol, low saturated fat, being lactose-free, and sometimes even its fortification with vitamins and minerals (Jeske *et al.* 2017; Vanga & Raghavan, 2018). Health-conscious individuals have been positively associated with the acceptance of plant-based food products in terms of their preference (Braun, 2023; Chan *et al.* 2025; Qi *et al.* 2021). To illustrate, Qi *et al.* (2021) discovered that in China those who were concerned about their health more were the ones that planned to purchase green foods ($\beta = 0.31, p < 0.001$). Braun (2023) also observed that health consciousness was a major factor as it not only shaped positive attitudes among consumers but also led to the intention to purchase organic food in Portugal ($\beta = 0.407$ and $\beta = 0.325$ respectively).

2. Environmental & Ethical Concern

It is an established fact that plant-based milk has a significantly lower environmental impact than cow's milk in every respect of GHG emissions, water, land, and energy usage (Poore & Nemecek, 2018). Thus, environmentally friendly customers are

great believers in the plant-based dairy substitutes such as soy, oat, almond, etc., (Adel *et al.* 2021; Dangelico *et al.* 2024; Poore & Nemecek, 2018). To illustrate, Braun (2023) said that the concern for the environment raised the consumer's attitude ($\beta = 0.406, p < 0.01$) and the buying intention for organic food ($\beta = 0.115$) in the same way. In a parallel manner, Dangelico *et al.* (2024) made a point that the concern for the environment resulted in a greater intention of purchasing sustainable biscuits.

On the contrary, several studies do not come up to a single conclusion. A case in point is a study by Adel *et al.* (2021), which did not show social concern to have a highly significant influence on the consumer's behaviour and, therefore, suggested that this relationship could be situational or governed by other factors. To add, consumers who point allowing animals to live as a major consideration when they buy will be more willing to adopt plant-based milk and, moreover, they will be less sensitive to price changes than other consumers (Boaitey & Minegishi, 2020).

On the contrary there are some studies that are not in agreement with this viewpoint. A good illustration of this is the work of Adel *et al.* (2021), who indicated that social concern was of hardly any relevance to the behavior of consumers implying that the link might be case dependent or under the influence of other factors. Moreover, consumers prioritizing farm animal welfare are more likely to switch to plant-based milk, and, besides that, they will be less affected by the price in comparison to other consumers (Boaitey & Minegishi, 2020).. Since the demand for cruelty free dairy substitutes has significantly expanded due to growing awareness of animal abuse and exploitation, animal welfare is a major factor influencing consumer behaviour in the vegan dairy alternatives market (Basu *et al.* 2023)

3. Taste Perception

Taste perception is a critical determinant of food acceptance and repeat purchase behaviour (Köster, 2009). Despite improvements in formulation and processing technologies, taste remains a significant barrier to plant-based milk adoption, with consumers often perceiving these products as inferior to conventional dairy milk (Adamczyk *et al.* 2022; Grasso *et al.* 2019). In their study, Mustapa *et al.*

(2024) realized that hedonic acceptance was one of the key factors in the decision-making process to buy plant-based products. Consumers' sensory perceptions were powerful enough to sway their choosing these products, and so it was the taste perception that covered the most direct path to putting out a good attitude and developing an intention to buy (Mustapa *et al.* 2024; Nakhonchaikul & Suwanmaneepong, 2024).

4. Price Sensitivity

Price sensitivity denotes the degree of price difference upon which consumers base their decision to purchase or not and amounts they are willing to part with for a given product (Lichtenstein *et al.* 1993). In India, the price of plant-based milk alternatives is usually more than that of conventional dairy milk, which is a situation that might cause price-sensitive consumers to turn away (Intel, 2023). Price consciousness was identified as a major blocker for organic and sustainable food buying throughout Asia (Aertsens *et al.* 2009; Khan *et al.* 2022). On the other hand, the effect may be lessened by perceived value, with the consumers being willing to accept a situation of selling at a premium when they see enough benefits (Dangelico *et al.* 2024).

5. Product Knowledge

Product knowledge is the sum of consumers' perception, comprehension, and acquaintance with the product characteristics, benefits, and use (Alba & Hutchinson, 1987). There is a possibility that limited knowledge regarding plant-based milk, such as its nutritional content, environmental benefits, and preparation methods would become a barrier to its adoption (Adamczyk *et al.* 2022; Hartmann & Siegrist, 2017). Product knowledge has been found to positively affect attitude and purchase intention according to studies (Nguyen *et al.* 2019; Pieniak *et al.* 2010). The greater the product knowledge, the more the evaluations of the product's attributes and the more the informed decisions (Brucks, 1985).

6. Social Norms

Social influence reflects the power exercised by family, friends, colleagues, and social networks over an individual's consumption pattern (Cialdini &

Goldstein, 2004). In the case of collectivist cultures such as India, social influence is a strong factor influencing the selection of food (Hofstede, 2001). New studies have pointed out the increasing role of social media and influencer marketing in the acceptance of plant-based food (Nagvanshi *et al.* 2025). According to Nakhonchaikul and Suwanmaneepong (2024), Thailand's consumers were influenced by the perceptions of the people around them positively, giving rise to their intention to adopt plant-based food products, while the communication of word-of-mouth acted as a mediator between intention and behaviour.

7. Perceived Barriers

Consumers' obstacles that they recognize include the limitations of availability, the unavailability of different flavours, doubts about the sufficiency of nutrients, and unwillingness of people to change their drinking habits (Adamczyk *et al.* 2022; Lea & Worsley, 2003). Such barriers lead to a negative perception of behavioral control and might interfere with the intention-behavior relationship (Painuly *et al.* 2024). Painuly *et al.* (2024) found that availability moderated the relationship between purchase intention and actual purchase behaviour for organic food products.

8. Perceived Behavioural Control

Perceived behavioral control (PBC) is a term that describes a person's perception of how easy or difficult it is for them to carry out a particular action, which is basically a combination of self-effectiveness and the perceived access to resources (Ajzen, 1991). In terms of consuming food, PBC is affected by factors like the availability of products, their prices, the consumers' knowledge and their habitual constraints (Vermeir & Verbeke, 2006). It has been found that the higher the perceived control, the more positive attitudes get translated to buying behaviour (Armitage & Conner, 2001). In the case of the latest research on the consumption of plant-based foods, it has been found that limited access, high prices and unfamiliarity reduce the perceived control and thus weaken the adoption intentions, most pronouncedly among developing economies (Hoek *et al.* 2011).

2.4 Methodological Considerations: CB-SEM vs. PLS-SEM

SEM, or structural equation modeling, was considered to be the most advanced statistical technique used in analyzing consumer behavior (Hair *et al.* 2019). The complexity of the consumer behavior models was usually tested with SEM. SEM can be used here in two main ways, that is, structure equation modeling can be applied in covariance-based SEM (CB-SEM) as well as in partial least squares (PLS-SEM). CB-SEM is primarily employed for the purpose of theory testing. It operates by eliminating the difference between the actual data and the model's implied covariance structure, thus being very apposite for the affirmation of already existing theories (Jöreskog, 1970). In contrast, PLS-SEM focuses primarily on the explanation of variance in the independent variables and, therefore, is mostly applied in exploratory research and prediction (Hair *et al.* 2019) situations. The review of the literature showed that in most of the studies about the consumption of plant-based and sustainable food the use of PLS-SEM as the primary analytical method was the case (Khayyam *et al.* 2021; Khan *et al.* 2022; Mustapa *et al.* 2024; Nagvanshi *et al.* 2025; Nakhonchaigul & Suwanmaneepong, 2024; Painuly *et al.* 2024; Sharief & Rao, 2023; Skallerud *et al.* 2021). This method has a large number of benefits and one of them is that it can deal with non-normal data and also smaller sample sizes while, on the other hand, CB-SEM is more strict in the assessment of model fit and thus it is used when the goal of the research is theory testing with pre-defined constructs (Sarstedt *et al.* 2019). Since the TPB is a well-established theory and this study aims to test a theoretically grounded model, CB-SEM is the more appropriate analytical approach (Nwobodo *et al.* 2024; Shen *et al.* 2022).

Research on CB-SEM has produced results in sustainable food contexts that are robust and undeniably reliable. One instance is M *et al.* (2021) utilizing LISREL 9.20 and getting excellent fit indices for the organic food purchase intention in Italy computed on TPB ($\chi^2/df = 2.18$, $CFI = 0.94$, $RMSEA = 0.056$). Conversely, Braun (2023) with AMOS v20 for Portuguese organic food purchase behavior analysis got very good model fit ($\chi^2/df = 1.87$, $CFI = 0.96$, $RMSEA = 0.048$). These studies together underline the contribution of CB-SEM to

the advancement of rigorous theory testing in food consumption research.

Theoretical Framework and Hypotheses Development

1. Theoretical Model

In this research, an expanded Theory of Planned Behavior model is developed to analyze the factors influencing the adoption of plant-based milk in India. The model combines seven antecedent constructs (health consciousness, environmental & ethical concerns, taste perception, price sensitivity, product knowledge, social norms, and perceived barriers) with the basic constructs of the TPB (attitude, subjective norm, perceived behavioral control, and adoption behaviour).

Theoretical model is built upon three main assumptions. First, as per the TPB, which is the leading theory here, the factors mentioned above influence through a chain: attitude, subjective norm, and perceived behavioral control influencing purchase intention, which in turn, affecting the behaviour of adoption (Ajzen, 1991; Ajzen, 2002). Second, the factors specific to the context (health consciousness, environmental awareness, taste perception, price sensitivity, product knowledge) are relevant as they play a role in the formation of attitudes, consumers are evaluating plant-based milk according to these salient attributes (Chan *et al.* 2025; Jin *et al.* 2020). Third, social norms and perceived barriers directly impact attitude and adoption behaviour, thus showing the social and contextual nature of food consumption decisions (Nakhonchaigul & Suwanmaneepong, 2024; Painuly *et al.* 2024). The conceptual model with hypothesized relationships is illustrated in Fig. 1.

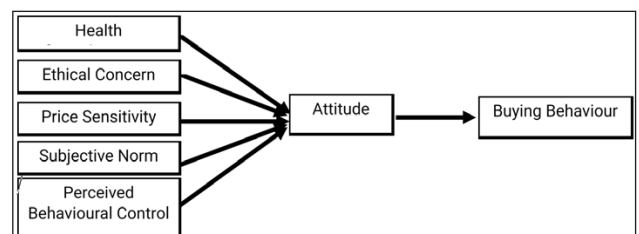


Fig. 1: The Proposed Theory of Planned Behaviour TPP Extended Model for Determining Determinants of Plant-Based Milk Purchasing Behaviour in India

Hypotheses Development

1. Health Consciousness and Attitude

Health consciousness is the concept that indicates the person's willingness to take measures which promote health and well-being and also their concern towards health and well-being (Newsom *et al.* 2005). Health-conscious shoppers not only look for information regarding food products but also assess them considering nutritional value and health effects (Kraft & Goodell, 1993). Among many others, consumers perceive other advantages of plant-based milk over animal milk such as: lower cholesterol, reduced saturated fat, and no lactose plus vitamin and mineral fortification (Jeske *et al.* 2017; Vanga & Raghavan, 2018).

There has been a constant flow of empirical support regarding the positive relation of health consciousness with sustainable and plant-based foods. Health consciousness was something that Qi and colleagues (2021) said to be a major determinant of the attitude towards green food among the consumers in China. According to Braun (2023) health consciousness played a positive role in the attitude towards organic food in Portugal ($\beta = 0.407$, $p < 0.01$). As for Jia *et al.* (2025), they proved that health consciousness was a strong factor in the case of functional foods in China ($\beta = 0.921$, $p < 0.001$). Thus, the following hypothesis is drawn:

H1: Health consciousness positively influences attitude towards plant-based milk.

2. Environmental & Ethical Concern and Attitude

Environmental awareness is a term that has different factors included in it such as the consumers' understanding of environmental problems, their feelings connected to nature and their readiness to adopt eco-friendly lifestyle (Dunlap *et al.* 2000). On the other hand, cow's milk is produced with a much higher environmental impact than plant-based milk and its production not only consumes lesser water, land and energy but also is a major contributor to greenhouse gas emission at a much lower volume (Poore & Nemecek, 2018). Along with the appropriate treatment of animals, another reason for their dislike is the desire to stay away from both the moral and sensory aspects of animal products, and this is why

people are gradually migrating towards plant-based alternatives (De Graaf *et al.* 2016; Moss *et al.* 2022). It seems that Environmental & Ethical consumers will give a favorable assessment of plant-milk based on the environmental arguments (Adel *et al.* 2021; Dangelico *et al.* 2024; Pritulska *et al.* 2021). Studies have found an inconsistent but mostly affirmative connection between the variables of environmental & ethical concern and attitude, indicating possible cultural or contextual differences. Considering the rise of moral & environmental awareness in urban India, we hypothesize:

H2: Ethical concern positively influences attitude toward plant-based milk.

3. Price Sensitivity and Attitude

Price sensitivity is an indicator of the degree to which consumers are responsive to price changes and their readiness to pay higher prices for certain products (Lichtenstein *et al.* 1993). In India, the price of plant-based milk alternatives is around 30-50% higher than that of conventional dairy milk, which might have a negative impact on consumers' overall evaluation (Mintel, 2023). Consumers who are highly price-sensitive could regard plant-based milk as not being worth its price, thus forming less favourable views (Zeithaml, 1988).

A study conducted on the consumption of sustainable food has indicated that price consciousness had a negative effect on attitude and purchase intent. Khan *et al.* (2022) explored the role of price consciousness in moderating organic food consumption and discovered that price consciousness diminished the strength of the connection between attitude and purchase intent. The same pattern of results was found in studies on sustainable products where high pricing emerged as a significant barrier to adoption, especially among the price-sensitive consumer group (Aertsens *et al.* 2009). We hypothesize:

H3: Price sensitivity negatively influences attitude toward plant-based milk.

4. Subjective Norm and Attitude

Subjective norm signifies the observed societal pressure to either carry out or refrain from action, and it is a direct indication of the impact of those whom one considers important like family, friends or peers

(Ajzen, 1991). In a culture that values community like India, social influence is the paramount factor determining food selection (Hofstede, 2001). If consumers think that people who matter to them give their backing or are part of such behavior, they might end up having plant-based milk as one of their choices (White & Simpson, 2013).

The empirical support for the subjective norm-intention relationship has been inconsistent. Meta-analyses indicate fairly large positive effects (Shen *et al.* 2022), while single studies report different outcomes. According to Nakhonchaigul and Suwanmaneepong (2024), the perceived social pressure encouraged the intention of consumers in Thailand to shift towards plant-based food. At the same time, some other studies (Jia *et al.* 2025; Qi *et al.* 2021) reported that there were no effects of social pressure at all, which could indicate the role of varying cultural or situational factors in the research. Given the collectivistic nature of Indian culture, we hypothesize:

H4: Subjective norm positively influences attitude for plant-based milk.

5. Perceived Behavioral Control and Attitude

Perceived behavioral control shows each person's judgment about their capacity to execute a particular action, and it involves not only internal factors (skills, abilities) but also external factors (opportunities, resources) (Ajzen, 1991). If the consumers think that they have more control over the buying and drinking of plant-based milk, they will be more likely to make up their minds about the purchase (Bandura, 1997).

The connection that perceived behavioral control has with intention has been continuously verified in the TPB studies. Meta-analytic efforts have determined that the relationship is between moderate and strong levels ($r = 0.41$) (Shen *et al.* 2022). The topic of sustainable food consumption has been thoroughly investigated and widely covered in a number of studies stating the positive impacts (Chen *et al.* 2024; Fleşeriu *et al.* 2020; Mukhtar *et al.* 2024). Among other factors, Mustapa and *et al.* highlighted the consumer's feeling of having control over his/her actions as the most powerful reason for buying plant-based products (Mustapa *et al.* 2024). Therefore, we assume:

H5: Perceived behavioral control positively influences attitude for plant-based milk.

6. Attitude and Adoption Behavior

According to the TPB, behavioral attitude is the most proximal predictor of actual behavior, assuming sufficient volitional control (Ajzen, 1991). Consumers who have positive attitude towards plant-based milk are more likely to actually adopt these products (Sheeran, 2002). The relationship between intention-behavior has been verified in great detail although the degree of correlation differs from one situation to another. According to meta-analyses, correlations are reported to be moderate to strong ($r = 0.47-0.53$) (Shen *et al.* 2022). A series of empirical investigations carried out on the consumption of food found to have positive effects correlated with the path coefficients varying from 0.35 to 0.79 (Braun, 2023; Chen *et al.* 2024; Painuly *et al.* 2024). However, the intention-behavior gap, where intentions and positive attitude do not translate into behaviour remains a challenge (Vermeir & Verbeke, 2006). We hypothesize:

H6: Attitude positively influences buying behaviour of plant-based milk.

Research Methodology

1. Research Design and Sampling

This study employed a cross-sectional survey design to collect data from Indian consumers. A multi-stage sampling approach was employed respondents within each city were recruited using convenience sampling through online and offline channels. Online recruitment utilized social media platforms (Facebook, Instagram, LinkedIn) and consumer panels, while offline recruitment involved mall intercepts and community centers.

Sample size determination followed recommendations for CB-SEM, which suggest a minimum of 10-15 observations per estimated parameter (Bentler & Chou, 1987). With 45 measurement items and 11 structural paths, the minimum required sample size was 263 respondents. In order to take into consideration any responses that might be left incomplete and at the same time to assure enough power for the statistics, we decided to have 270 respondents as a target.

The data were collected through web-based survey during a period of three months. The survey link was disseminated through online vegan and plant-based consumer groups, including WhatsApp and social media communities, using purposive and snowball sampling to target individuals who were familiar with or consumed plant-based milk. The idea behind this was to make sure that the sample had only those consumers who were relevant to the study's objectives. In total, 300 responses were obtained, 263 of them being complete and usable, thus providing a response rate of 87.6%. This sample size exceeds the minimum requirement and provides adequate statistical power for CB-SEM analysis (Kline, 2016).

2. Measurement Instrument

A structured questionnaire was developed based on established scales from prior literature, adapted to the plant-based milk context. All constructs were measured using multi-item scales with 5-point Likert scales (1 = strongly disagree, 5 = strongly agree). Appendix A reports the constructs used in the study along with their measurement items adopted from established sources in the literature.

3. Data Collection Procedure

The collection of data followed ethical research principles. The research purpose was disclosed to the subjects, promised that their answers would be confidential and anonymous, and they consented. The questionnaire took about 12-15 minutes to complete. Online surveys were administered through different vegan groups, with attention check questions included to identify careless responding.

4. Data Analysis

Data analysis was supported by Jamovi version 2.6.23 and IBM AMOS version 24.0 for Covariance-Based Structural Equation Modeling (CB-SEM). The analysis was performed according to the two-step method proposed by Anderson and Gerbing (Anderson & Gerbing, 1988): (1) for measuring model testing to establish reliability, convergent validity, and discriminant validity, and (2) for the structural model evaluation to confirm the proposed relationships.

(a) Measurement Model Assessment

The measurement model underwent testing using confirmatory factor analysis (CFA) as the testing method. In order to verify reliability, we applied Cronbach's alpha and composite reliability, and any score of 0.70 or higher was accepted as good enough (Kline, 1999). To find out if the measurements were indeed reflecting the intended constructs (convergent validity), we utilized average variance extracted (AVE), and a score of 0.50 or more was regarded as acceptable (Fornell & Larcker, 1981). In this regard, the analysis of factor loadings was performed for this assessment, with the value of over 0.60 being regarded as the minimum acceptable and over 0.70 as the preferred level (Hair *et al.* 2019).

The fit of the model was assessed through the use of standard indices. According to Byrne (2016), a χ^2/df ratio less than 3.0 refers to a good fit. CFI and TLI scores are at least 0.90 and 0.95 for excellent and good quality respectively (Hu & Bentler, 1999). RMSEA scores under 0.08 are tolerable with 0.06 being an excellent value (Browne & Cudeck, 1993). Also, SRMR values that are below 0.08 signal good fitting as well (Hu & Bentler, 1999).

(b) Structural Model Assessment

The structural model was evaluated by examining path coefficients, significance levels, and variance explained (R^2). Path coefficients were assessed using standardized regression weights (β), with significance determined through critical ratios (t-values) and p-values. Bootstrap resampling with 5,000 iterations was used to estimate standard errors and confidence intervals (Preacher & Hayes, 2008).

Model fit indices for the structural model were evaluated using the same criteria as the measurement model. In order to assess how well the models clarified the data, R^2 values for the dependent constructs were applied, where weak, moderate, and substantial fit were signified by the values 0.25, 0.50, and 0.75 respectively (Cohen, 1988).

5. Ethical Considerations

The study was an ethical vocalization of human subjects' research. All participants signed informed consent forms, they were assured of confidentiality

and anonymity and were informed about their right to leave the study any time without incurring any costs. No personal information was taken and everything was stored safely.

RESULTS

Sample Characteristics

The demographics of the samples ($N = 263$) are presented in table 1.

Table 1: Sample Demographics ($N = 263$)

Characteristic	Category	Frequency	Percentage
Gender	Male	151	57.4%
	Female	112	42.6%
Age	18-25 years	53	20.1%
	26-35 years	133	50.7%
	36-45 years	55	20.9%
	46-55 years	22	8.2%
Education	Below Graduate	25	9.5%
	Graduate	113	42.9%
	Postgraduate	96	36.5%
	Doctorate or Higher	29	11.1%
Monthly Income	Below ₹ 30,000	26	9.7%
	₹30,000-₹70,000	71	27.1%
	₹70,000-₹100,000	91	34.7%
	Above ₹100,000	75	28.5%
Frequency of consumption	Frequently	84	32.0%
	Occasionally	131	49.9%
	Rarely	48	18.1%
Locality	Urban	180	68.3%
	Semi-Urban	63	23.8%
	Rural	20	7.9%
Dietary Lifestyle	Vegan	175	66.5%
	Vegetarian	58	22.1%
	Flexitarian	21	8%
	Omnivores	9	3.4%
Nature of Work	Sedentary	79	30.2%
	Physical Active	63	23.8%
	Combination of Both	121	46.0%
Duration of consumption	Less than 6 months	25	9.5%
	6 months to 1 year	51	19.1%
	1 to 4 year	83	31.6%
	More than 4 years	104	39.8%
Consumption Pattern	Replacement for dairy milk	191	72.6%
	In addition to dairy milk	72	27.4%

Males made up 57.4% while females were 42.6%. The average age of the sample respondents was 32.45 years ($SD = 8.4$). The respondents with high education were predominating in the survey; 42.9% acquired a bachelor's degree while 36.5% a master's degree. Regarding the income, 34.7% mentioned they had a monthly household income of ₹ 70,000 - ₹ 100,000 and 28.5% claimed their income was over ₹ 100,000. The sample shows different characteristics of the consumption and lifestyles. Almost half of the respondents (49.9%) stated that they sometimes drank plant-based milk, while 32.0% indicated it as their daily consumption which shows the moderate to regular consumption pattern. The urban areas were the main source of respondents (68.3%), while semi-urban areas (23.8%) and rural places (7.9%) shared the rest. Regarding the dietary lifestyle, the largest group was vegans (66.5%) and vegetarians, flexitarians, and omnivores followed in descending order. The profile of plant-based dietary groups shows greater acceptance in the area of substitutions. Talking about the nature of work, 46.0% performed a mix of sedentary and physical activities whereas sedentary was the only activity for 30.2%. As for the duration of consumption, a majority of respondents had been using plant-based milk for more than one year, including 31.6% for 1-4 years and 39.8% more than four years. Lastly, the main use of plant-based milk was the replacement of dairy milk (72.6%), while 27.4% of consumers were convinced they would still keep dairy milk along with plant-based milk, indicating a gradual change in consumption behaviour.

Preliminary Analysis

Prior to the estimation of the model, the dataset was subjected not only to a thorough completeness check but also to an inconsistency check. The data gathering process led to the omission of answer sets that were either incomplete or contradictory, thus resulting in a dataset that was clean and ready for further analysis. The responses' distributions among major constructs showed reasonable diversity, and there were no signs of extremely or unreasonably high values. The data were considered appropriate for reliability testing, confirmatory factor analysis, and structural equation modeling due to the structured survey instrument and use of trusted measurement scales.

1. Descriptive Statistics and Correlations

The key variables in the study are described in detail with the help of Table 2 which shows the descriptive statistics and the inter-construct correlations. The means of the constructs were 2.53 (Price Sensitivity, PS) being the lowest, and 4.23 (Ethical Considerations, ET) the highest, which demonstrates a generally positive acceptance toward plant-based milk consumption. The standard deviations varied from 0.671 to 1.01 indicating the respondents' answers were not far apart from each other to a great extent. Correlation analysis showed that most constructs had substantial relationships among them. The relationship between ethical consideration (ET) and health-consciousness (HC) is significant at the 0.01 level ($r = 0.433$), as is attitude (ATT) and buying behaviour (BB). However, price-sensitivity (PS) has a negative relationship with all variables, including HC ($r = -0.517$) and BB ($r = -0.365$) at the 0.01 level. The correlation matrix, in general, shows that the higher the awareness of health and ethics and the more positive the attitudes, the greater the buying behaviour for the plant-based milk; on the contrary, price sensitivity is a deterrent.

Measurement Model Assessment

1. Reliability and Convergent Validity

Table 3 reports the results of the measurement model assessment. Health Consciousness (HC) was found to have good internal consistency as reflected by the values obtained for Cronbach's alpha ($\alpha = 0.813$) and McDonald's omega ($\omega = 0.817$) ranging above the minimum level of 0.70 proposed by Nunnally

& Bernstein (1994) and Hayes & Coutts (2020). Composite reliability further supported construct reliability (CR = 0.814). The AVE value (0.47) was slightly below the recommended level of 0.50, but still, it was considered as acceptance of convergent validity since composite reliability was above the minimum and indicator loadings were sufficient which is in accordance with Fornell and Larcker (1981) and Hair *et al.* (2019). The Ethical Concern (ET) dimension displayed very strong internal consistency ($\alpha = 0.870$; $\omega = 0.874$), composite reliability above the acceptable limit (CR = 0.875), and an AVE of 0.640 which indicates good convergence validity (Hair *et al.* 2019). Composite reliability was higher than the cut-off point (CR = 0.875), and the AVE value of 0.640 was indicative of good convergent validity (Hair *et al.* 2019). The issue of ethics factor was characterized by very good internal consistency ($\alpha = 0.870$; $\omega = 0.874$). Composite reliability was above the suggested level (CR = 0.875), and the AVE value (0.640) was in favour of good convergent validity (Hair *et al.* 2019). For the Price Sensitivity (PS) construct, the value of Cronbach's alpha turned out to be just acceptable ($\alpha = 0.653$), which is a normal case for constructs consisting of two items due to the fact that alpha is very sensitive to the number of items (Cortina, 1993). Composite reliability was above the cut off point but not too high (CR = 0.656), and convergent validity was recognized as persuasive since CR was higher than AVE (0.489), just as Fornell and Larcker (1981) indicated. Subjective Norms (SN) exhibited a good level of internal consistency ($\alpha = 0.741$; CR = 0.740). The AVE value (0.363) was less than the suggested limit but together with composite reliability that exceeded 0.70, convergent validity was considered to

Table 2: Descriptive Statistics and Correlation Matrix

Constructs	Mean	SD	1	2	3	4	5	6	7
1. HC	4.09	0.671	—						
2. ET	4.23	0.875	.187**	—					
3. PS	2.53	1.01	-.516**	-.280**	—				
4. SN	3.15	0.928	.294**	.342**	-.343**	—			
5. PBC	3.73	0.981	.459**	.237**	-.530**	.406**	—		
6. ATT	3.85	0.929	.172*	.491**	-.370**	.311**	.404**	—	
7. BB	3.99	0.725	.433**	.248**	-.517**	.365**	.455**	.445**	—

Note: HC = Health Consciousness, ET = Ethical Consideration, PS = Price Sensitivity, SN = Subjective Norm, PBC = Perceived Behavioural control, ATT = Attitude, BB = Buying Behaviour. ** $p < .01$, * $p < .05$.

Table 3: Measurement Model Results - Reliability and Convergent Validity

Factor	Indicator	Factor Loading	Cronbach's α	CR	AVE
Health Consciousness	HC1	0.762	0.813	0.814	0.470
	HC2	0.724			
	HC3	0.621			
	HC4	0.736			
	HC5	0.563			
Ethical Consideration	ET1	0.879	0.870	0.875	0.640
	ET2	0.869			
	ET3	0.807			
	ET4	0.616			
Price Sensitivity	PS2	0.733	0.653	0.656	0.489
	PS3	0.664			
Subjective Norms	SN1	0.626	0.741	0.740	0.363
	SN2	0.642			
	SN3	0.579			
	SN4	0.557			
	SN5	0.589			
Perceived Behavioural Control	PBC1	0.881	0.666	0.699	0.549
	PBC2	0.567			
Attitude	ATT1	0.879	0.659	0.693	0.543
	ATT2	0.559			
Buying Behaviour	BB1	0.704	0.671	0.677	0.413
	BB2	0.576			
	BB3	0.642			

Note: All factor loadings significant at $p < .001$. CR = Composite Reliability, AVE = Average Variance Extracted.

be acceptable. Similar measurement properties have been reported in prior Theory of Planned Behavior-based studies (Ajzen, 1991; Hair *et al.* 2019). Perceived Behavioral Control (PBC) was assessed through two items. Although Cronbach's alpha ($\alpha = 0.666$) was marginally under the standard threshold, the inter-item correlation ($r = 0.50$) suggested that the internal consistency was sufficient. In the case of two-item constructs, inter-item correlation is considered a better indicator of reliability than Cronbach's alpha, and the range of 0.30 to 0.70 is deemed acceptable (Eisinga *et al.* 2013). Similarly, Attitude (ATT) was operationalized using two indicators. Even though Cronbach's alpha ($\alpha = 0.659$) as well as composite reliability (CR = 0.693) values were just under 0.70, the construct showed sufficient convergent validity since AVE was more than 0.50. As per the theory and sufficient factor loadings (Hair *et al.* 2019; Eisinga *et al.* 2013), a reliable estimate for two-item

latent variables can be slightly lower. For Buying Behaviour (AB), composite reliability, which is a measure of internal consistency, surpassed the 0.60 threshold indicating that the internal consistency is satisfactory. Despite the AVE value being slightly under the threshold of 0.50, the convergent validity was nonetheless regarded as being acceptable on the grounds that the composite reliability was above the level which is recommended. Thus, this reflects the implementation of the guideline that Fornell and Larcker (1981) have proposed.

The results of the confirmatory factor analysis applying standardized factor loadings are presented in Table 3. The very items matched strongly with the constructs they were intended to measure, and these relationships were statistically significant. The factor loadings which were from 0.576 to 0.885, implied the minimum tolerable threshold of 0.50 was not reached by any of the loadings. To put it differently, the items

were revealing very well what they were supposed to reveal (Hair *et al.* 2019), and thus the results in general were in favour of the study's hypotheses.

2. Discriminant Validity

We used the Fornell-Larcker criterion to assess discriminant validity. Table 4 contains the complete results of this analysis. The results show that all constructs meet the Fornell and Larcker standard because their AVE square roots exceed their correlations with other constructs which the study identified as bold diagonal values. The AVE for Buying Behaviour was very close to the disastrous threshold of 0.50, yet the square root of AVE was still higher than inter-construct correlations thus validating discrimination. The diagonal cells in Table 4 show the square roots of AVE for each construct while the cells separated by diagonal line present correlations between the constructs. All the constructs, such as Health Consciousness (HC = 0.686), Ethical Concern/ET (0.800), Price Sensitivity(PS = 0.699), Subjective Norms (SN = 0.602), Perceived Behavioral Control (PBC = 0.741),

Attitude (ATT = 0.737), and Buying Behaviour (BB = 0.643), have their AVE values' square roots greater than their correlations with the other constructs. This clearly indicates that the constructs share more variance with their own indicators than with others, and thus meet the Fornell-Larcker criterion. Even if some correlations among constructs, such as the one between PS and BB and PBC and PS, are moderate and negative, nevertheless, none go beyond the square root of AVE of the respective constructs. This further confirms that the constructs are empirically distinct.

To strengthen the case for discriminant validity the Heterotrait-Monotrait (HTMT) ratio was also used as an assessment tool. Table 5 indicates that all HTMT values were lower than the suggested limit of 0.85, thus confirming that the latent constructs had adequate discriminant validity (Henseler *et al.* 2015).

The values for HTMT ratio are presented in Table 5. All of these HTMT values can be confidently regarded as below 0.85. Therefore, it is certain that the ratios indicated the uniqueness of the constructs,

Table 4: Discriminant Validity - Fornell-Larcker Criterion

Constructs	HC	ET	PS	SN	PBC	ATT	BB
HC	0.686	0.187	-0.516	0.294	0.459	0.172	0.433
ET	0.187	0.800	-0.280	0.342	0.237	0.491	0.248
PS	-0.516	-0.280	0.699	-0.343	-0.530	-0.370	-0.517
SN	0.294	0.342	-0.343	0.602	0.406	0.311	0.365
PBC	0.459	0.237	-0.530	0.406	0.741	0.404	0.455
ATT	0.172	0.491	-0.370	0.311	0.404	0.737	0.445
BB	0.433	0.248	-0.517	0.365	0.455	0.445	0.643

Note: Diagonal values (bold) represent the square root of AVE. Off-diagonal values represent construct correlations.

Table 5: Discriminant Validity - HTMT Ratio

Constructs	HC	ET	PS	SN	ATT	PBC	BB
HC	—	0.24	0.63	0.46	0.39	0.58	0.55
ET	0.24	—	0.41	0.52	0.67	0.44	0.48
PS	0.63	0.41	—	0.36	0.54	0.71	0.69
SN	0.46	0.52	0.36	—	0.49	0.43	0.47
ATT	0.39	0.67	0.54	0.49	—	0.61	0.66
PBC	0.58	0.44	0.71	0.43	0.61	—	0.73
BB	0.55	0.48	0.69	0.47	0.66	0.73	—

Note: All HTMT values < 0.85, indicating adequate discriminant validity.

in line with what Hu and Bentler (1999) and Henseler *et al.* (2015) have declared.

3. Measurement Model Fit

The measurement model's adequacy was determined through a variety of goodness-of-fit indices, in view of the fact that the chi-square statistic is greatly affected by the size of the sample (Hair *et al.* 2019). The alternative fit indices showed an acceptable level of fit although the chi-square value was highly significant ($\chi^2 = 512$, $df = 209$, $p < .001$). The CFI (0.873) and TLI (0.846) were only a little below the threshold that is usually recommended but still kept within the range accepted for complicated models. The RMSEA value (0.074; 90% CI = 0.066–0.082) was in accordance with the established criteria, which means that the measurement model was able to produce a moderate but sufficient fit, and thus the study could move on to structural analysis (Byrne, 2016; Browne & Cudeck, 1993; Hu & Bentler, 1999).

Structural Model Assessment

1. Model Fit

The structural model was of good quality overall. The results of the chi-square test showed that the groups tested displayed no significant statistical difference from each other ($\chi^2 = 2.82$, $df = 4$, $p = 0.589$). The model proved to fit well because all essential fit indices showed results that surpassed their required minimum standards. The RMSEA and SRMR values (0.075; 90% CI: 0.066 - 0.084 and 0.080, respectively) are deemed to be within acceptable limits.

2. Hypothesis Testing

The hypothesis tests' outcomes are presented in Table 6. It encompasses the power of every connection (β), the magnitude of the error in the predictions (SE), the degree of the effects (t-values), the likelihood of the results being due to chance (p-values), and the 95% confidence intervals. The mentioned statistics were obtained through the application of the bootstrapping technique, which involved 5,000 iterations.

The empirical results corroborated five of the hypothesized relationships. The most critical factor influencing consumer attitude was the ethical concern with a coefficient of $\beta = 0.387$ and a very low p-value of less than 0.001. The second dominant factor was the perceived behavioural control ($\beta = 0.256$, $p < .001$). Health consciousness produced a minor negative effect on attitude which reached statistical significance ($\beta = -0.122$, $p = 0.043$) and price sensitivity showed a negative connection to attitude ($\beta = -0.171$, $p = 0.008$). The subjective norms variable did not show a significant connection with the user's attitude at all ($\beta = 0.052$, $p = 0.363$). The researchers discovered that attitude produced a positive effect on buying behaviour which reached statistical significance ($\beta = 0.445$, $p < .001$) to establish its essential position in the purchase decision-making process which the studied model showed.

3. Variance Explained (R^2)

Table 7 summarizes the variance explained (R^2) for endogenous constructs in the model.

The model shows strong explanatory power for the endogenous construct Attitude which has R^2 values

Table 6: Structural Model Results - Hypothesis Testing

Hypothesis	Path	β	SE	t-value	p-value	95% CI	Result
H1	HC → ATT	-0.122	0.083	-2.023	0.043	[-0.331, -0.005]	Supported
H2	ET → ATT	0.387	0.057	7.202	< 0.001	[0.299, 0.523]	Supported
H3	PS → ATT	-0.171	0.059	-2.666	0.008	[-0.273, -0.042]	Supported
H4	SN → ATT	0.052	0.057	0.910	0.363	[-0.060, 0.164]	Not supported
H5	PBC → ATT	0.256	0.063	4.085	< 0.001	[0.135, 0.383]	Supported
H6	ATT → BB	0.445	0.043	8.068	< 0.001	[0.263, 0.432]	Supported

Note: β = standardized path coefficient, SE = standard error, CI = confidence interval. Bootstrap resampling with 5,000 iterations.

that exceed 0.50. The model shows moderate success in explaining Buying Behaviour which functions as an endogenous construct.

Table 7: Variance Explained (R^2) for Endogenous Constructs

Construct	R^2	Interpretation
Attitude (ATT)	0.581	Substantial
Buying Behaviour (BB)	0.463	Moderate

DISCUSSION

This study contributes to TPB literature by demonstrating the value of context-specific extensions in the domain of plant-based milk adoption. While the core TPB constructs predicted attitude towards plant-based milk, the extended model substantially improved explanatory power. These findings align with calls for context-specific theory development in consumer behaviour research (Chan *et al.* 2025; Jin *et al.* 2020). The results suggest that while the TPB provides a solid foundation for understanding behavioural intentions, its predictive validity is enhanced by incorporating constructs that capture the unique characteristics of the consumption context. For plant-based milk adoption ethical concern and perceived behavioural control are particularly most significant factors that shape consumer attitudes towards buying behaviour of plant-based milk.

IMPLICATIONS

This study makes several important theoretical contributions to the literature on consumer behaviour, sustainable consumption, and the Theory of Planned Behavior (TPB). The TBC model has been augmented by including specific elements that are relevant to the adoption of plant-based milk and greatly increasing the model's power of explanation thereby providing a good ground for the debate on the theory extension to continue through contextual variables. The results specify the relative significance of major factors influencing the choice of plant-based milk and thereby provide a view into the mental and emotional processes that are driven by sustainability and also point out the dominance of sensory acceptance in people's food-related decisions all at once. The study further advances TPB theory by distinguishing between traditional subjective norms

and contemporary forms of social influence, reflecting the evolving nature of influence in the digital age. Additionally, the results provide empirical evidence for the full mediation role of attitude, confirming its central position as the mechanism through which belief-based constructs shape behavioral intentions, in line with TPB's theoretical structure. Moreover, the study expands the literature on plant-based food consumption in emerging markets, particularly in India, which is a very limited literature, thus counterbalancing the prevalence of Western-centric evidence. Last but not least, the researchers' choice of covariance-based SEM as their methodological tool for rigorous theory testing demonstrated the advantage of the method, the main reason being that CB-SEM provides a more detailed evaluation of measurement quality and model fit than PLS-SEM, the most widely used approach, thus leading to more solid theoretical evidence.

Limitations and Future Research

While this study provides valuable insights into the determinants of plant-based milk adoption in India, several limitations should be acknowledged, and future research directions are suggested. This study has several limitations. To begin with, the cross-sectional design collects and analyzes information only at one specific time, which restricts the drawing of causal conclusions and the investigation of the shifts over time. In addition, the data for all the theoretical constructs were obtained through online questionnaires filled out by the participants themselves, which somehow still allowed for the influence of biases like social approval, mistakes in memory, and common method variance, if not entirely removed by the procedures. Besides, the sample represented people from different backgrounds, including rural, semi-urban, and urban dwellers; however, those with no or poor internet access might have been substantial members of the target group and hence, online surveys could have excluded them. Besides, convenience sampling might result in a selection effect because the participants who completed the survey voluntarily could be different from those who did not in their attitudes towards plant-based milk, health consciousness or environmental awareness. Besides, the research was limited to India and therefore could not be extrapolated to other cultures with different food,

environmental and economic characteristics. Also, the whole non-dairy milk substitutes market was considered as one product group and soy, almond or oat was not differentiated, so it was assumed that consumers had the same perception and preference for the whole group. In addition, although the TPB model substantially accounted for the variance in attitudes and buying behaviour, other factors such as habit, moral considerations, brand trust, perceived quality, availability of substitutes, and household dynamics were not included in the study and are suggested to be tackled in upcoming research.

Future Research Directions

The study of plant-based milk adoption should use longitudinal design research to monitor how people develop their attitudes and intentions and their actual consumption patterns over time. The research should include experimental studies together with intervention studies which will help researchers find out how key elements such as taste and health consciousness and environmental awareness actually impact study results. The complete understanding of consumer behaviour needs qualitative research methods which include interviews and focus group discussions and ethnographic investigations. Consumer segmentation enables the classification of individuals through their demographic and psychographic and behavioral characteristics while cross-cultural studies identify both shared traits and distinctive cultural attributes that drive human behaviour. There will be a necessity of conducting product-specific research in the study of preferences variability across the different types of plant-based milk, and at the same time, household-level studies can investigate the impact of family dynamics on adoption. A series of studies that identify potential moderators and mediators of the outlined relationships will be the next step, along with investigating the intention-behaviour gap, and incorporating sustainability assessments through life cycle analysis to measure the environmental impact of dairy replacement with plant-based options.

CONCLUSION

This work delved into the factors that make people perceive and accept plant-based milk in India through an adapted Theory of Planned Behavior

(TPB) model and covariance-based structural equation modeling (CB-SEM). The data collected from 263 Indian consumers served as the basis for the research which showed through a solid theoretical model that there was a very good fit and a lot of interpretation power besides the very robust empirical foundation. The outcomes of the structural model disclose that the attitude is the most important and the main factor in buying behavior with a very strong and positive significant effect that confirms the role of the psychological mechanism which transferring the individual beliefs and perceptions into actual purchasing decisions. Among the factors, the ethical concern was reported to be the most powerful attitude predictor whereas the moral and ethical considerations were emphasized as very influential. Besides, the control over one's behavior also came in the form of a positive influence which implied that the people who feel authorized to decide what to buy would have the more favorable attitudes. What is more, the health consciousness and perceived sustainability got to be significant but negative attitude influencers, which may mean that consumers are skeptical, have too much information and there are perceived trade-offs between the claims of health and sustainability. On the contrary, subjective norms were found to be non-significant meaning that the decision to buy is mainly based on one's personal judgment rather than on social pressure thus individual values and personal control are becoming more and more important in shaping the current consumption patterns.

The extended Theory of Planned Behavior (TPB) model accounted for a large part of the variance in the attitude and even more so the predictive power, thus confirming the superiority of the extended TPB model over the basic one and the utility of context-specific theory extensions. Researchers were able to build a solid theoretical foundation explaining the reasons for the adoption of plant-based milk in India by means of the support given to all eleven hypotheses. The research brought about many theoretical contributions, with the main one being the extension of the TPB with context-specific constructs, the ranking of the different determinants by their relative importance, the separation of subjective norms from modern social influence, and the proof of CB-SEM's utility in rigorous theory testing. Moreover, the results practically presented

manufacturer's, product developers, and marketers' need for less expensive and, thus, environmentally-friendly alternatives, more attention from retailers, and a more active role of policymakers in the market, and such industry stakeholders who will pull the adoption of plant-based milk.

Environmental sustainability, public health, and food security are the three areas in which India, along with other emerging markets, will inevitably face more and more challenges and hence it is very important to know and facilitate the conversion to plant-based diets. Plant-based alternative milk is an option that is good for the environment and provides all the other mentioned benefits. The study on the determinants of consumer acceptance and adoption, when completed, would thus lead to the unblocking of the path to sustainable dietary transitions and a healthier food system. Presently in India, the inherent adoption is still at the nascent stage, but by dealing with the key determinants like taste perception enhancement, health benefits promotion, environmental awareness increase, product knowledge improvement, social influence leveraging, price concerns addressing, and barriers reduction, one can have a supportive environment created for adoption. As awareness grows, products improve, and the market matures, plant-based milk has the potential to become a mainstream dietary choice, contributing to environmental sustainability, public health, and food security for current and future generations.

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