

Review

Consumer Attitudes and Market Acceptance of Plant-Based Milk Alternatives: A Scoping Review

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Abstract

The consumption of plant-based milk alternatives (PBM) has increased rapidly in recent years due to growing concerns about sustainability, health, and animal welfare. This study summarizes international research on consumer behavior related to PBM products based on large-sample questionnaire surveys and openly accessible sources. A scoping review was conducted following the PRISMA Extension for Scoping Reviews (PRISMA-ScR) and the methodological framework of Arksey and O'Malley. Relevant articles were identified through the Web of Science, ScienceDirect, and Dimensions databases. After a two-stage screening process, only Open Access journal articles published between 2018 and 2024 were included, covering studies conducted across Europe, North America, the Middle East, the Far East, and Australia. Eligible studies used questionnaire-based methods, involved at least 200 respondents, and focused on consumer behavior toward plant-based milk alternatives. The selected studies were analyzed using the “when–where–what” framework, considering research periods, geographical locations, and investigated topics. Findings were synthesized in a summary table and supported by a graphical model illustrating key consumer behavior dimensions. Results show that taste, health consciousness, environmental sustainability, and animal welfare are the main drivers of PBM consumption across different countries and cultures. However, price sensitivity, nutritional concerns, and strong attachment to conventional dairy products remain significant barriers to wider adoption. These findings can support the identification of target consumer groups and the market positioning of PBM products, while also providing a foundation for future consumer behavior research. By establishing the scope, volume and comparability of the existing quantitative evidence base, this scoping review also assesses whether the literature is sufficiently mature to support a subsequent systematic review.



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1. Introduction

In recent years, plant-based beverages or plant-based milk alternatives (commonly known as plant-based milks) have become one of the fastest-growing segments of the global food and beverage market [1]. The global market was valued at USD 19.42 billion in

2023 and is expected to grow to USD 32.35 billion by 2030, representing a CAGR of 7.6%. Asia is the largest and fastest-growing market globally. The region generated revenues of USD 9.869 billion in 2024 and is expected to grow to USD 15.860 billion by 2030 (8% CAGR), representing 47.4% of the global market [2]. Europe is a key market, accounting for 21.8% of the global market in 2024. The market size of the continent was USD 4.54 billion in 2024 and is expected to grow to USD 6.94 billion by 2030 [3]. The United States is also one of the largest markets, generating revenues of USD 3.768 billion in 2024 and is expected to grow to USD 5.557 billion by 2030 (CAGR of 6.5%). The US will account for 18.1% of the global market in 2024 [2].

To avoid misunderstandings regarding the name, it is worth clarifying that among plant-based beverages, only coconut milk can be called milk; in all other cases, the name beverage should be used [4]. Consumer attitudes towards this product category are increasingly shaped by the complex interaction of environmental, health, ethical and lifestyle factors. As society becomes more environmentally conscious, health conscious and sensitive to animal welfare, more and more people are looking for alternatives that fit their value-based decisions [5]. The willingness to pay (WTP) for PBMs is thus not only linked to objective product characteristics—such as taste, texture or appearance—but also to the benefits associated with the products, especially health and environmental aspects [5,6].

Despite the growing body of research on plant-based milk alternatives, prior reviews in this field have tended either to synthesize a narrow set of studies in depth or to summarize the market and product landscape without systematically mapping the underlying consumer-behavior evidence base. It remains unclear how the existing quantitative consumer research is distributed across time, geographical context, and behavioral focus, and which consumer-behavior dimensions have been examined jointly versus in isolation. This review addresses this gap by mapping—rather than exhaustively synthesizing—the peer-reviewed, questionnaire-based literature on consumer attitudes and market acceptance of plant-based milk alternatives, in order to identify the main research trends, thematic foci, and gaps that can guide future consumer-behavior research and inform market positioning.

2. Theoretical Background

To give this section a coherent conceptual structure, the dimensions discussed below are organized around two complementary, widely used theories of consumer behavior. The Theory of Planned Behavior (TPB [7]) explains behavior as a function of attitudes toward the behavior, subjective norms, and perceived behavioral control, and is well suited to the more individually evaluated dimensions of PBM consumption—health beliefs, sensory expectations, and price-related perceived control. The Value-Belief-Norm theory (VBN [8]) explains pro-environmental and ethically motivated behavior as the outcome of personal values, beliefs about consequences, and a felt moral obligation to act, and is well suited to the environmental- and animal-welfare-related motivations documented in this literature. The health, sensory and price-related factors discussed below are therefore treated as TPB-type, individually evaluated dimensions, while the environmental and ethical (animal welfare) factors are treated as VBN-type, value-driven dimensions; this distinction is used again in Section 3 to structure the data-charting variables and in Section 4.2 to organize the driver/barrier synthesis of the included studies.

Health awareness and environmental motivations are closely related but conceptually distinct drivers of PBM consumption; the following paragraphs first discuss health-related considerations and then turn to environmental, ethical and lifestyle-related motivations. Several consumers choose PBM products for their beneficial nutritional content, as they are naturally lactose-free and suitable for those with lactose intolerance or milk protein sensitivity [9]. In addition, many PBMs are artificially fortified to more closely resemble

the micronutrient profile of cow's milk, although there are still noticeable differences in protein content and other nutritional values. These health considerations often go hand in hand with environmental considerations, and together they create a value-based consumer attitude [10].

Compared to conventional dairy production, plant-based alternatives tend to have lower greenhouse gas emissions and water use and are therefore perceived as more sustainable by environmentally conscious consumers [11]. However, this perception is nuanced: for example, almond milk has been criticized for its significant water requirements, suggesting that sustainability claims should be examined on a product-by-product basis. Nevertheless, perceptions of environmental friendliness contribute significantly to the willingness to pay for PBM, especially among climate-conscious consumer groups [12].

However, positive attitudes and values alone do not guarantee product choice—sensory attributes continue to play a key role. The taste, appearance, and nutritional value of PBM products strongly influence consumer preferences, so by prioritizing these, the industry may be able to refine its product offering to better align with the diverse needs of the market, thereby promoting wider acceptance of plant-based diets [13]. Marketing strategies that focus on these attributes can significantly increase purchase intention [5]. Expanding the range—with the introduction of soy, almond, or oat—allows for the satisfaction of different taste and lifestyle needs, further increasing the appeal of PBM products [14].

Ethical considerations, especially animal welfare concerns, also play a prominent role in attitudes towards PBM products. These considerations often merge with environmental and health arguments, forming a complex, value-driven set of considerations that reinforce the choice of plant-based alternatives [15,16]. It is important to note that the target audience for PBM products is no longer limited to vegans or vegetarians, but the growing number of people with lactose intolerance and milk allergies also contributes to the expansion of demand [17].

Despite positive trends, several challenges hinder the widespread adoption of plant-based milk alternatives. Higher retail price is one of the main barriers, especially for lower-income consumers, for whom accessibility may be a barrier even despite favorable perceptions [18].

Additionally, the different nutritional profiles of different PBM products can create uncertainty for consumers, especially those who are health-conscious. Addressing these challenges—for example, through information campaigns, pricing strategies, and targeted product development—may be key to promoting the further adoption of plant-based milk alternatives [19].

Taken together, these two theoretical lenses suggest that consumer acceptance of PBM products is shaped jointly by individually evaluated factors (health, sensory attributes, price—TPB) and value-driven factors (environmental sustainability, animal welfare—VBN). This distinction directly informs the data-charting scheme applied in Section 3 (Materials and Methods): for each of the 17 included studies we coded not only when and where the research was conducted, but also which of these TPB- and VBN-related dimensions were addressed in the research questions, which in turn structures the driver/barrier synthesis presented in Section 4.2.

Building on these theoretical strands, the aim of this scoping review is to map how health, environmental, ethical, sensory and price-related factors have been investigated in the existing quantitative consumer research on plant-based milk alternatives—identifying when, where and on what these studies have focused—rather than to provide an exhaustive synthesis of the entire evidence base. A deliberate focus on large-sample, questionnaire-based studies also served a practical, forward-looking purpose: by aggregating methodologically comparable and statistically robust studies and mapping which marketing-mix

elements, external factors and consumer-behavior topics they addressed, this review offers researchers a clear reference point for replicating the study design in a new national context or identifying underexplored segments for future research.

To operationalize this aim, the review was guided by four explicit research questions: (RQ1) What temporal and geographical patterns characterize the existing quantitative consumer research on plant-based milk alternatives? (RQ2) What methodological approaches—sampling, survey design and analytical technique—have been applied across the included studies? (RQ3) Which health-, environmental-, ethical-, sensory- and price-related themes recur as drivers of and barriers to consumer acceptance? (RQ4) What gaps in the current evidence base would justify a subsequent, more narrowly focused systematic review?

3. Materials and Methods

To prepare this scoping review, we worked according to the PRISMA 2020 methodological description and its extension for scoping reviews (PRISMA-ScR [20]), following the framework of Arksey and O'Malley [21] as refined by Levac et al. [22] (Rethlefsen et al. [23]). We have completed the PRISMA 2020 checklist and uploaded it as Supplementary Table S1 to demonstrate adherence to the reporting guideline. In line with PRISMA-ScR and Joanna Briggs Institute (JBI) guidance for scoping reviews, the review question was further structured using the Population–Concept–Context (PCC) framework: Population comprised consumers and non-consumers of plant-based milk alternatives; Concept encompassed the health-, environmental-, ethical-, sensory- and price-related attitudes and behaviors addressed by the research questions above; and Context was defined as large-sample, questionnaire-based quantitative consumer research published in Open Access sources. To support the relevance of the keywords used during the identification, we conducted a preliminary survey of their frequency of use using the publication search website Dimensions.ai. Based on the survey, the number of articles written in English on the topic of plant-based milk (PBM) between 1976 and 2025 can be estimated at 34,077. In order to define the research topic, we used the following search terms and operators, with the 'free text in full data' setting: 'plant based milk' OR 'plantbased' AND 'milk', OR 'plant milk' OR 'dairy alternative'. Both the number of published papers and their academic significance have seen a significant increase since 2018, as the number of annual citations has exceeded 30,000 every year since then, and has shown sustained exponential growth. The peak of citations so far is in 2024: 174,916.

In the first step defined by the PRISMA protocol, we used three publication databases (last searched on 20 January 2025): Web of Science, Science Direct and Dimensions online search engines, with the help of which 1221 publications were identified. The process, including the steps, is illustrated in Figure 1. In each case, the searches were carried out in the 'topic' field, i.e., in the abstracts, keywords, and titles. The number of identified studies was reduced to 1181 after the duplicative analysis. In the second step, the following operators were applied during the 'screening' to achieve more accurate results: 'plant based milk' OR 'plantbased milk' OR 'plant milk' OR 'dairy alternative' AND 'marketing' OR 'consumer' AND 'perception'. This specified the topic and filtered the articles published in the field of plant milk alternatives according to the research discipline. The identical search string was applied, in quotation marks exactly as shown above, to the 'topic' field (abstract, keywords and title) of all three databases; no additional database-specific filters (e.g., publication date range, document type or subject-area facets) were applied beyond this topic-field search. In the second round of screening, the availability and format of the studies provided the basis for narrowing down, so only 'open access' journal articles were included in the suitability assessment. This step excluded 51 records that did not meet the

open-access criterion (Web of Science: $n = 41$; Science Direct: $n = 7$; Dimensions: $n = 3$; see Figure 1), which quantifies the scale of this scope restriction. During the content assessment, the abstracts of 107 articles were carefully read, during which the focus of the research topic emerged as a suitability requirement: the examination of consumer behavior related to PBM products. We also specified the methodology used, and for inclusion, the authors had to use a large-sample, quantitative survey of at least 200 people. The inclusion of results collected using different quantitative methods with smaller, though still reliable, sample sizes could indeed provide valuable additional insight in an extended, future review. In the present study, we included only questionnaire-based surveys, since for this method research reliability can be evaluated as a function of the sampling procedure, which also satisfies the transparency requirements of PRISMA. Our research focused on the structured comparison of large-sample, questionnaire-based studies. The minimum sample size of 200 respondents set as an inclusion criterion for the selected articles was justified by the relationship between effect size and statistical power [24]. For consumer questionnaire surveys such as those examined here, samples below 200 respondents are generally not considered adequate for drawing reliable conclusions, which would also call into question the comparability of results across the individual studies.

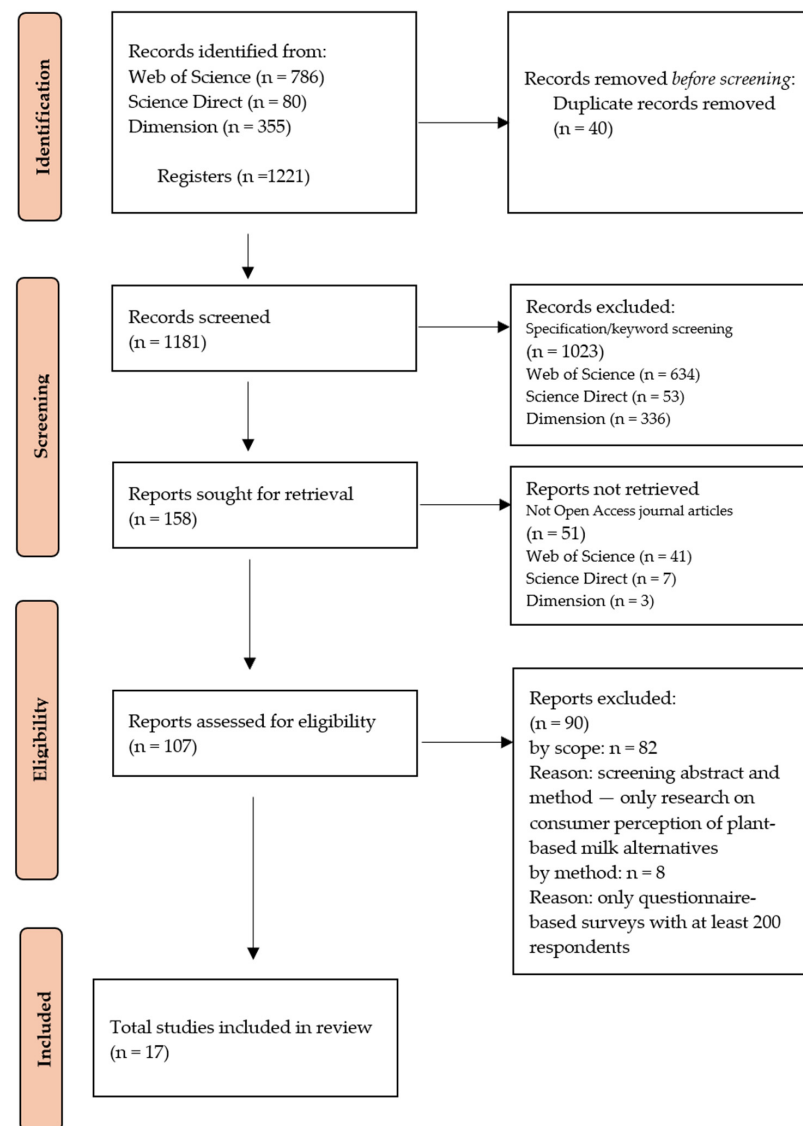


Figure 1. Flowchart of the scoping review (identification, screening and inclusion) process. Source: Own edition based on PRISMA protocol (2025).

Consistent with the PCC framework above, these eligibility criteria were applied as a deliberate, a priori scope-delimitation choice rather than an attempt at exhaustive coverage: by prioritizing methodologically comparable, statistically robust, large-sample studies, this review is positioned as a first-stage evidence map that can inform whether the literature is mature enough to support a subsequent, more narrowly focused systematic review (see Section 5.2).

As a result of the PRISMA-guided scoping review protocol, 17 articles were included in the full content analysis, all of which are closely related to the corpus of our research.

4. Results

The following sections first present the main characteristics of the studies included in the qualitative assessment, then a summary presentation of the content of each publication and an analysis of their conclusions through synthesis using the consumer behavior model.

4.1. Basic Attributes of the Articles Included in the Study

The general characteristics of the scientific journal articles selected for content analysis are presented along the principles of when, where, and what. For each of the 17 included studies, the publication year and data-collection period, the country/region of data collection, and the consumer-behavior dimensions addressed in the research questions were manually extracted and coded by the research team; the resulting frequencies are visualized in Figures 2–4.

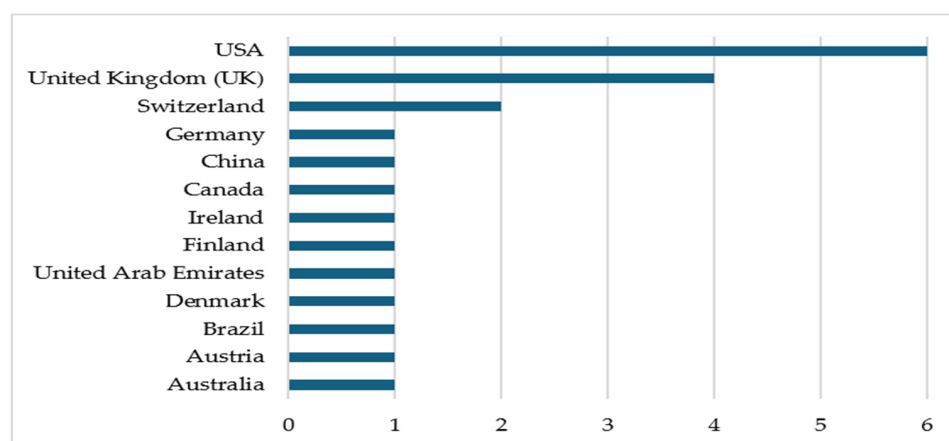


Figure 2. Target countries of the studies examined. Source: Own edition (2025).

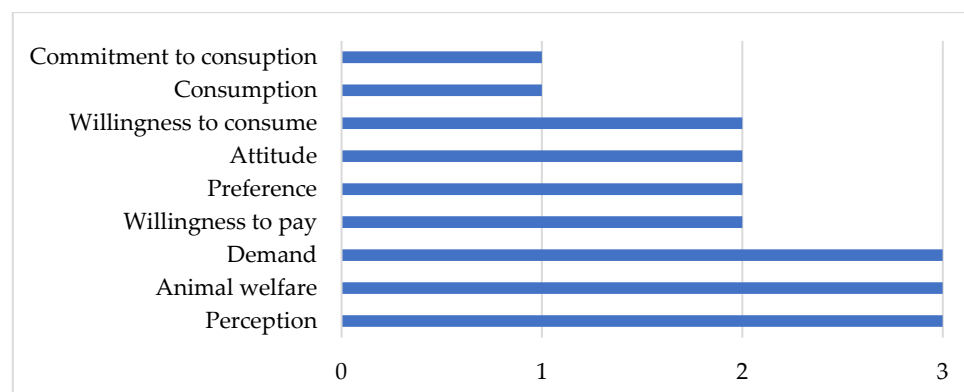


Figure 3. Factors influencing consumer behavior examined by research. Source: Own edition (2025).

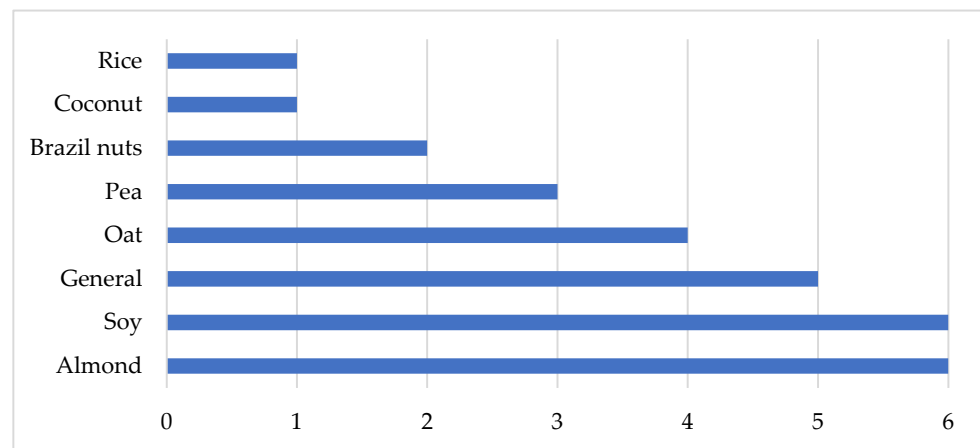


Figure 4. Plant-based milk alternatives in focus of studies, according to their ingredients. Source: Own edition (2025).

Considering the years of the studies and their publication dates is essential for the research, as these factors can help identify the strength of global trends affecting consumer behavior in the given periods [25]. The publication dates of the studies examined, as previously determined, fall between 2018 and 2024. However, some research covered a wider time spectrum than the year of publication.

In five of the journal articles examined, no specific time was specified for data collection, so the year of publication was used as the basis. In the case of two studies, we can speak of data collection spanning several years. Considering the years of data collection of the studies, 2019 was the most popular (5 research studies), followed by 2020, 2021, and 2023 (4 research studies), with only one publication remaining.

The publications examined have a diverse geographical scope. In some articles, multinational data collection can be observed, while in others, the researchers focused mainly on one country or a specific region within it. The geographical scope of the studies is illustrated in Figure 2.

The studies examined seven European countries, with the United Kingdom being the focus of four studies. In addition to Europe, the Middle East and Far East, as well as Australia, were represented. In terms of countries, the most articles (6) examined the consumer habits of the United States.

The answer to the question “what?” is provided by the main factors influencing consumer behavior formulated in the research questions. However, considering the specificity of the research topic, it is also worth presenting the specific product types, which cannot be separated from either the question or the results obtained. Figure 3 presents the issues affecting consumer behavior, while Figure 4 lists the types of plant-based milk alternatives that are the focus of the studies according to their raw materials.

Figure 3 clearly shows sustainability—operationalized across the reviewed studies mainly as environmentally friendly production, lower ecological footprint, and reduced greenhouse gas emissions compared to conventional dairy—as an important research aspect. Sustainable nutrition, of which health awareness is an integral part, is not a new research area, but it is still of unbroken importance [26], as is also evident in the articles examined. Motivation, perception, demand and willingness to pay (WTP) also form important cornerstones of the research questions of the articles examined. Regarding the topic of PBM products, the proportion of the examination of animal welfare aspects should also be highlighted, which precedes the topics of preference, attitude and willingness to consume. Research questions aimed at specific consumption and commitment to consumption appeared in one article each.

Figure 4 shows the PBM ingredients included in the studies. Almond and soy were the most popular, followed by general plant-based substitutes not mentioned in the articles. The individual ingredients were mostly not exclusively mentioned in the articles, meaning that it was possible to compare them with each other or with traditional cow's milk.

The "general" category in Figure 4 refers to studies that investigated plant-based milk alternatives as a broad category rather than focusing on a single type, typically comparing consumer perceptions and choices between conventional dairy milk and multiple PBM varieties within the same survey instrument. Tulysewski et al. [27] examined consumption frequencies of animal-based dairy and plant-based milk in Australia across soy, almond, oat, rice and macadamia milk to capture a comprehensive view of the dairy-alternative market, while Rombach et al. [15] explored US consumers' willingness to pay across eight PBM types (almond, rice, soy, coconut, hemp, oat, peanut and pea milk). Rombach et al. [16] similarly investigated factors influencing US consumers' willingness to try PBM alternatives, listing almond, rice, pea and hemp milk as examples, and Haas et al. [28] compared the product image of cow's milk with plant milk in general, noting that soy milk was the dominant PBM at the time of the study while almond, cashew and coconut milk were gaining popularity. Halme et al. [29], although primarily focused on oat milk, also reported that 45% of respondents used plant-based milk, with the large majority consuming oat milk but a minority relying on other types. These five studies were therefore coded as "general" in Figure 4, since they addressed the plant-based milk category as a whole, across several ingredient types, rather than a single, specific alternative.

4.2. Detailed, Summary Presentation of the Articles Included in the Study

The studies are presented in order of the first author's name in Table 1. Following the in-text citation formula, the table contains the original title of the studies, the countries of the studies, the range and number of respondents, the form of analysis of the questionnaire databases, and the main results of the research.

Table 1 summarizes the main characteristics of the publications examined, including the scope of the survey participants, the analysis structure, and the main findings that are in line with the focus of the research. As a result of the scoping review's literature collection, the examination of consumer perceptions/behavior related to plant-based milk substitutes appears as a common element in all studies. Table 1 highlights the diversity of research approaches and, thus, the differences between the conclusions. Figure 5 was created to deepen the analysis, drawing a parallel between the topics processed by each study (and presented in the conclusion) and the simplified model of consumer behavior that is included as a common element of the research.

Read across the driver/barrier lens introduced in Section 2, Table 1 allows the 17 included studies to be synthesized explicitly into recurring drivers and barriers of PBM acceptance, and to compare how these vary across countries and studies.

Table 1. Summary of the articles included in the study.

Intertextual Citation Formula	Title	Country	Respondents	Number of Respondents	Analytical Method	Key Conclusions
[14]	Understanding Swiss consumption of plant-based alternatives to dairy products	Switzerland	Swiss consumers and non-consumers, representative sample by age, gender and language region	1204	Mann-Whitney U test	Consumers are generally younger, well-educated urban flexitarians, with taste, health and environmental sustainability being the most common reasons for consumption.
[30]	Milk, mylk or drink: Do packaging cues affect consumers' understanding of plant-based products?	USA	US consumers and non-consumers over the age of 18.	600	One-way analysis of variance ANOVA	Packaging imagery influences sensory expectations and the perceived origin of the product. Compared to the term "drink," the term "mylk" increased the willingness to try it.
[31]	Market-oriented Development of Plant-based Food and Beverage Products: A Usage Segmentation Approach	Ireland	People living in Ireland (86.2%), United Kingdom (14.8%), mainly women, with higher education.	456	Binary logistic regression, principal component analysis	Main motivations for consuming PBM: sustainability, animal welfare and health. Restraining force: lack of taste or sensitivity that triggers consumption.
[32]	Sustainable consumption by product substitution? An exploration of the appropriation of plant-based 'mylk' in everyday life	UK	A representative cross-section of the UK population.	7370	Multinomial logistic regression	In many cases, there is no real substitution, PBM products are consumed together with cow's milk. Consumption is less common among people with lower income/education. Supply systems influence consumption.
[33]	Perception, knowledge, and insights on the Brazilian consumers about nut beverages	Brazil	The majority are 26–36 years old and over 60 years old.	300	Descriptive statistics and analysis of variance ANOVA.	Most commonly consumed: almond drink. Consumer acceptance is increasing, actual consumption is not, reason: high price, health concerns.
[34]	Consumers' perceptions of healthiness and environmental friendliness of plant-based and dairy product concepts	Switzerland	Age and gender representative sample of the Swiss population.	518	Repeated measures analysis of variance (ANOVA), and principal component analysis.	Conventional dairy products are considered healthier and more environmentally friendly than PBM products, typically overestimating the healthiness of cow's milk.
[28]	Cow Milk versus Plant-Based Milk Substitutes: A Comparison of Product Image and Motivational Structure of Consumption	Austria	It is representative of the Austrian population in terms of socio-demographic factors.	1001	<i>t</i> -tests and correlation analysis, increasing reliability: bootstrapping.	Traditional cow's milk has a better product image, is healthier, and more natural. PBM products are easier to digest and have less milk sensitivity.

Table 1. Cont.

Intertextual Citation Formula	Title	Country	Respondents	Number of Respondents	Analytical Method	Key Conclusions
[35]	Milking the Alternatives: Understanding Coffee Consumers' Preferences for Non-Dairy Milk	Intercontinental 19 countries	United States (23%), United Arab Emirates (22%), United Kingdom (11%), Germany (11%), Canada (9%).	200	Frequency analysis, multiple regression analysis.	When consumed with coffee, taste is the most important thing. Paying a premium does not affect the increasing desire to consume. Promotions for PBM products were more memorable than those for traditional milks.
[29]	The perceived value of oat milk and the food-choice motives of young, urban people	Finland	Aalto University students	308	BWS best-worst scaling, Hierarchical Bayes (HB) estimation, and Latent class analysis.	For young consumers, sustainability is more important than taste preference in PBM products.
[36]	Perceptions toward Plant-Based Milk Alternatives among Young Adult Consumers and Non-Consumers in Denmark: An Exploratory Study	Denmark	Danish youth aged 16–35, 171 consumers, 170 non-consumers.	341	Cluster analysis, Student <i>t</i> -test.	The most frequently consumed PBM product is oat drink. Consumers mainly get their information from packaging and social media. Attitudes about how healthy and processed a product is more important in purchasing decisions than environmental awareness.
[15]	“Got Milk Alternatives?” Understanding Key Factors Determining U.S. Consumers' Willingness to Pay for Plant-Based Milk Alternatives	USA (Washington)	With consumers and interested parties, persons responsible for shopping over the age of 18.	486	Descriptive statistical analyses, PLS-based structural equation modelling (PLS-SEM).	Lifestyle changes have increased the retail popularity of PBM products. Animal welfare, food curiosity, and green and clean product image emerged as influencing factors.
[16]	Leave the Milk for the Calf and Spread the Word: Exploring Factors Determining US Consumers' Willingness to Try Plant-Based Milk Alternatives and Their Word-of-Mouth Sharing about Plant-Based Milk Alternatives	UK	Those over 18 years old interested in plant-based milk substitutes.	486	External and internal model analysis.	The willingness to pay is increased and word-of-mouth information sharing is stimulated by displaying environmental awareness in the messages of PBM products. Concerns about animal welfare have a positive impact on the willingness to try.

Table 1. Cont.

Intertextual Citation Formula	Title	Country	Respondents	Number of Respondents	Analytical Method	Key Conclusions
[9]	Consumer perception of the sustainability of dairy products and plant-based dairy alternatives	USA (North Carolina)	Consumers and non-consumers.	608 and 777	Univariate and multivariate statistical methods, Kruskal-Wallis analysis of variance and mixed logit methods.	Health is a key factor in sustainability. PBM products are generally perceived by consumers as more sustainable, and labelling plays an important role in this.
[37]	Parents' implicit perceptions of dairy milk and plant-based milk alternatives	USA	Parents in the United States with at least one child under 18. Also drink milk and plant-based beverages.	331	Analysis of variance ANOVA, binomial logistic regression.	Nearly three-quarters of parents have positive associations with cow's milk: 85% of them drank milk as children, but only 38% encourage their children to do so. Their main objection is the hormones and antibiotics in milk.
[38]	Cheese without cows: Consumer demand for animal-free dairy cheese made from cellular agriculture in the United Kingdom	UK	Representative for the UK by gender and age.	1249	Descriptive statistics and mixed logit models.	According to his forecast, the conditional market share of "cheese products" free of animal ingredients could reach 22% if their price exceeds the price of premium conventional cheese by 25%; however, this share remains highly sensitive to price changes.
[5]	Consumers' Preferences and Attitudes towards Plant-Based Milk	China	Residents of the Jing-Jin-Ji metropolitan region, Beijing, Tianjin, Hebei.	819	Double-bounded dichotomous choice method (DBDC).	Willingness to pay (WTP) is significantly influenced by appearance, taste, nutritional value, environmental and health awareness. The same is true for neophobic consumers.
[27]	Factors Influencing Consumption of Animal-Based Dairy and Plant-Based Milk Alternatives in Australia	Australia	Representative of the Australian population in terms of gender, age, education, and place of residence.	4196	ANOVA tests, multinomial logit regression models.	Three consumer groups can be distinguished, in increasing order of popularity: 1, exclusively plant-based milk alternatives, 2, exclusively animal-based products, and 3, mixed consumers. Age and diet strongly influence the inclusion in the groups.

4.2.1. Drivers of PBM Acceptance

Four recurring drivers emerge from Table 1. Health consciousness and taste are reported as leading motivations in Western and Central European contexts, such as Switzerland [14] and Ireland/UK [31]. Environmental sustainability and animal welfare feature prominently in UK- and US-based marketing-focused studies, where communication emphasizing these values increased willingness to pay and word-of-mouth sharing in the USA [9,15] and the UK [16]. In Northern Europe (Finland), sustainability concerns outweighed taste as a purchase driver among young consumers [29], while in East Asia (China) willingness to pay was shaped jointly by appearance, taste, nutritional value, and environmental/health awareness [5]. Packaging and product naming also emerged as sensory-adjacent drivers: framing a product as “mylk” rather than “drink” increased US consumers’ willingness to try it [30].

4.2.2. Barriers to PBM Acceptance

Price sensitivity and an entrenched perception of conventional dairy as the healthier, more natural option are the most consistently reported barriers. UK consumers showed strong price sensitivity toward animal-free dairy analogs [38], and Brazilian consumers cited high price and health concerns as reasons why positive attitudes did not translate into actual consumption [33]. Two European studies directly contradict the sustainability-driver narrative found elsewhere in the literature: Austrian [28] and Swiss [34] consumers still perceived conventional cow’s milk as healthier, more natural, and even more environmentally friendly than PBM products. A related tension appears among US parents, most of whom retain a positive association with cow’s milk for their children and cite concerns about hormones and antibiotics as a reason not to encourage PBM consumption [37]. Findings on price sensitivity are themselves not fully consistent across contexts: while price was a decisive barrier in the UK and Brazilian studies noted above, an intercontinental study on PBM consumption with coffee found that paying a premium did not reduce consumers’ desire to consume PBM products across 19 countries [35], suggesting that the salience of price as a barrier may depend on the consumption context (at-home purchase versus out-of-home consumption) rather than being uniform across situations.

Overall, Table 1 suggests a geographic pattern in which health and taste dominate in Western and Central Europe, environmental and ethical motivations are more explicitly leveraged in marketing-focused UK and US studies, sustainability outweighs taste among younger Nordic consumers, and price sensitivity together with attachment to conventional dairy remains a stronger barrier in Brazil, the UK, and among US parents than in intercontinental, out-of-home consumption contexts.

Beyond thematic content, Table 1 also reveals recurring methodological patterns across the 17 included studies. Variance-based comparison techniques (ANOVA and related tests) were applied in five studies [27,30,33,34,37]; regression- and choice-based modelling (logistic, multinomial or mixed-logit regression, PLS-SEM, or discrete-choice methods such as DBDC) were applied in nine studies [5,9,15,16,27,31,32,35,38], most frequently to estimate willingness to pay or predict adoption intentions; cluster- or segmentation-based approaches (latent class analysis, cluster analysis) were applied in two studies [29,36]; and simpler non-parametric or descriptive comparisons (Mann-Whitney U tests, *t*-tests) were applied in two studies [14,28]. Several studies combined more than one technique—for instance, Tulysewski et al. [27] paired ANOVA with multinomial logit regression—which, together with the comparable large-sample designs required by the eligibility criteria, indicates a body of literature methodologically mature enough to support quantitative synthesis in a future, more narrowly scoped systematic review (see Section 5.2).

The main elements shown in Figure 5 are intended to illustrate those elements of the simplified model of consumer behavior that were actually addressed by the reviewed studies. Thus, elements of the model that were not mentioned in the conclusions drawn by the studies have not been included in the figure for the sake of clarity. In Figure 5, a solid line connects the authors of the studies with the topics they focused on. The dashed line illustrates a negative influence between each element and PBM products, based on the related studies.

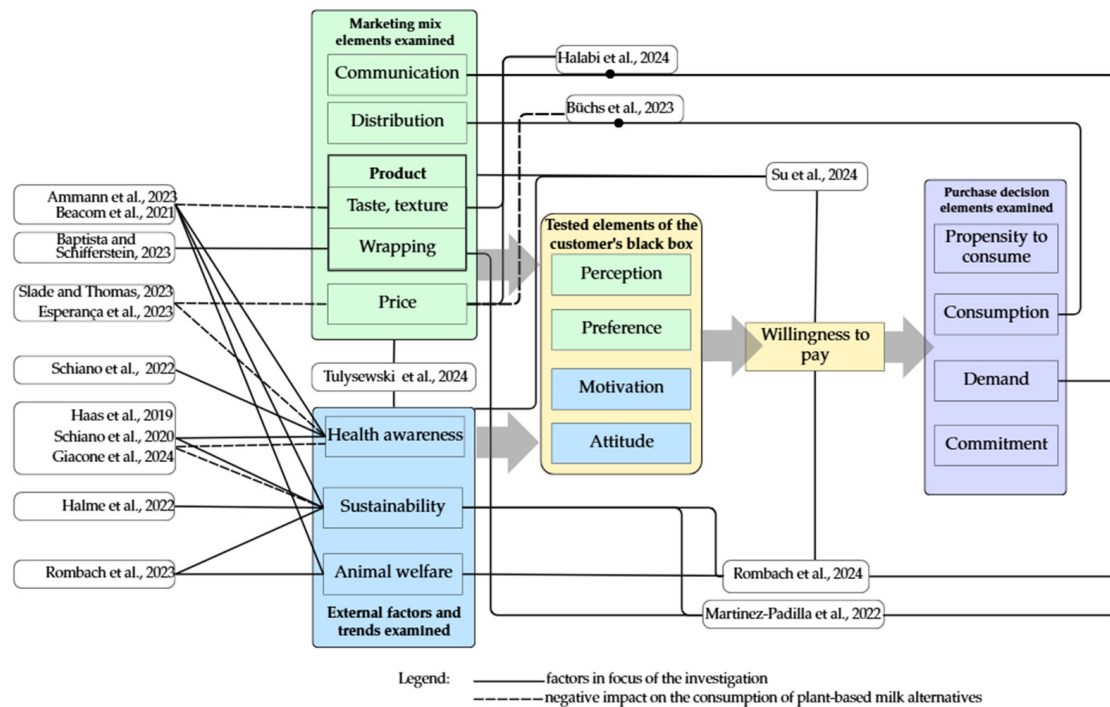


Figure 5. Depicting the relationship between 17 studies examining consumer perceptions of PBM products in light of the relevant consumer behavior model elements [5,9,14–16,27–38]. Source: Own edition (2025).

The area marked with a green box contains the marketing mix elements discussed in the publications. The product received special emphasis in the list of mix elements, since in addition to taste and texture, the main elements related to the evaluation of foods, several studies have focused on packaging as a silent seller [39]. The blue box lists external factors and trends that appeared prominently in the articles examined, such as health awareness, sustainability, and animal welfare, which elements had a significant impact on consumer motivation and attitude.

The four content elements of the customer's black box were also indicated based on the studies. The green and blue color codes represent the relationship between certain external stimuli (such as marketing mix elements or external factors) and the internal characteristics of the consumer. The studies examined paralleled the effects of the listed marketing mix elements with individual perception and preference, while motivation and attitude were characterized by the influence of external factors and trends.

All of the external and internal elements affecting the consumer, either together or separately, had an impact on the willingness to pay, which led directly to the purchase decision (purple field). In the latter case, we consider not only positive, i.e., actually realized purchases, but also the refusal to purchase [40]. Of the elements appearing in the studies, the topics of real consumption, willingness to consume, demand for products, and actual commitment came to the fore as the output elements of the process. Two of the latter factors were the focus of the studies in four of the studies included in the analysis [16,32,35,36],

comparing consumption and demand with certain input, i.e., external factors. This was done by Rombach et al. [16], who discovered a positive relationship between demand and the communication of given products. In their study, the aforementioned authors discussed the willingness to pay, as well as the effects of sustainability and animal welfare on motivation and attitude, which can indirectly affect both the willingness to consume and commitment. Büchs et al. [32] focused exclusively on marketing mix elements in their analysis. In their results, they found that the availability of products influences the level of consumption, while among the input factors, pricing, more precisely the price of products approaching the reservation level, has a negative effect on the perception and thus indirectly on the purchase decision.

On the left side of the figure, arranged in common clusters, are those authors who primarily examined input external factors (12 studies). Among them, Tulysewski et al. [27] examined marketing mix elements and external factors in a complex manner, as did Su et al. [5], who also addressed willingness to pay separately.

Figure 5 also shows the popularity of the treatment of individual topics among the studies. Health awareness and sustainability played a significant role, but it is worth highlighting that there were very different results in terms of context. The explicitly negative relationship (dashed line) in the case of sustainability symbolizes the condemnation of the processed nature of plant-based milk alternatives and the positive image of cow's milk as natural and environmentally friendly. In the cases marked with a solid line, this relationship assumes a positive shift in the perception towards PBM products. The same can be said about health awareness, where those who prefer PBM products found the drinks to be less fatty and easy to digest, while the traditional healthy image of cow's milk also appeared.

5. Conclusions

5.1. Discussion of Key Findings

Based on the results of this scoping review, it can be concluded that consumer attitudes towards PBM products were most consistently associated with four main groups of factors: health awareness, sustainability considerations, animal welfare aspects, and taste and other sensory properties. The listed factors were consistently recurring in the 17 studies examined (Table 1), which is consistent with, though not necessarily generalizable beyond, broader global trends.

At the same time, the sources examined also highlighted that, in addition to positive motivations, there are constantly inhibiting factors that slow down the wider spread of the category. These include price sensitivity and nutritional reservations. According to the research [34], a significant proportion of consumers consider cow's milk to be healthier and more natural than PBM products, which represents a competitive disadvantage for certain consumer groups. The results of Haas et al. [28] also confirm that the positive image of conventional milk (considered healthier, more natural and of better quality) creates a strong emotional attachment that PBMs find difficult or impossible to counter. In parallel, these studies [5,16] prove that willingness to pay is closely related to health and sustainability benefits, and animal welfare considerations also have a strong influence on consumer decisions.

Marketing mix elements also played a decisive role in the studies examined. Büchs et al. [32] research shows that product availability and price directly shape consumption, while Baptista and Schifferstein [30] argue that the linguistic and visual cues of packaging significantly shape the willingness to try. Similarly, Halabi et al. [35] highlighted that in the context of coffee consumption, taste is a decisive factor, while the premium has a lesser influence on choice. Their results support that the spread of PBMs is not only determined by value-based motivations, but also by their fit with consumption situations and expectations.

The expansion of the PBM product market requires the combined operation of several factors. In addition to improving sensory quality and reducing nutritional uncertainties, consumer education and transparent communication are key. The results of Schiano et al. [9] also show that sustainability perceptions are strongly dependent on labeling and information transfer, so authentic, value-based communication can directly contribute to strengthening positive attitudes. For market players, therefore, in addition to precise target group definition, the integrated positioning of functional characteristics (taste, nutritional value, accessibility) and value-based messages (health, environment, animal welfare) can be an effective strategy.

5.2. Conclusions, Limitations and Future Research Directions

Overall, this scoping review highlighted that consumer acceptance of PBMs fits global patterns but is realized to varying degrees due to local cultural and economic factors.

An important direction for future research could be to track longer-term changes in consumer attitudes and to examine how socioeconomic differences affect the integration of PBM products into everyday consumption habits.

A useful result for market players operating in the segments covered by the reviewed literature is that the wider acceptance of plant-based milk alternatives requires an integrated strategy that builds on consumer values and product and communication solutions that align with expectations.

This review has several limitations that should be considered when interpreting its findings. First, the inclusion of Open Access articles only was a deliberate scope-delimitation choice for a review of this size rather than an attempt at an exhaustive synthesis; as shown in Figure 1, this restriction excluded 91 records that had otherwise passed topical screening, which may have excluded relevant subscription-based studies and could introduce publication-related bias. We did not systematically characterize the methodological or thematic composition of these excluded records (e.g., the proportion employing qualitative or mixed methods), so the direction and extent of this potential bias cannot be assessed from the present data; a full systematic review including non-open-access literature would be needed to test the robustness of the patterns identified here. Second, restricting eligible studies to questionnaire-based research with at least 200 respondents excluded 8 otherwise eligible studies employing qualitative, experimental, or smaller-sample designs (see Figure 1), which could offer complementary insights into the mechanisms behind consumer attitudes. Third, the geographical distribution of the included studies is uneven, with a stronger representation of European and North American contexts, which limits the generalizability of the findings to underrepresented regions. Finally, differences in constructs, measurement scales, and samples across the 17 included studies limit direct comparability and preclude a quantitative (e.g., meta-analytic) synthesis.

Future research could build on this mapping in several concrete directions: (1) conducting a full systematic review or meta-analysis focused specifically on willingness-to-pay and price-sensitivity outcomes—identified in Section 4.2 as the most methodologically mature and comparable sub-area within this literature—while also incorporating non-open-access and qualitative or experimental studies to test the robustness of the drivers and barriers identified here; (2) applying harmonized, theory-based measurement instruments (e.g., grounded in the Theory of Planned Behavior or the Value-Belief-Norm framework) across countries to enable direct cross-cultural comparison; and (3) conducting longitudinal studies that track how health, sustainability and price-related attitudes toward plant-based milk alternatives evolve over time and translate into actual purchase behavior.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/agriculture16151613/s1>, Table S1: PRISMA checklist.

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