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University of Nicosia, Cyprus

*CORRESPONDENCE
Yuriy Danko
✉ y.danko@snau.edu.ua

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Packaging of organic food—the dilemma of consumers' internal and external motives

Olena Nifatova[1,2], Kseniia Bliumska-Danko[2,3], Sandra Charreire-Petit[3] and Yuriy Danko[2]*

[1]Barcelona Economic Analysis Team, University of Barcelona, Barcelona, Spain, [2]Research Department, Sumy National Agrarian University, Sumy, Ukraine, [3]Researcher, Networks, Innovation, Territories and Globalisation Laboratory, Université Paris-Saclay, Paris, France

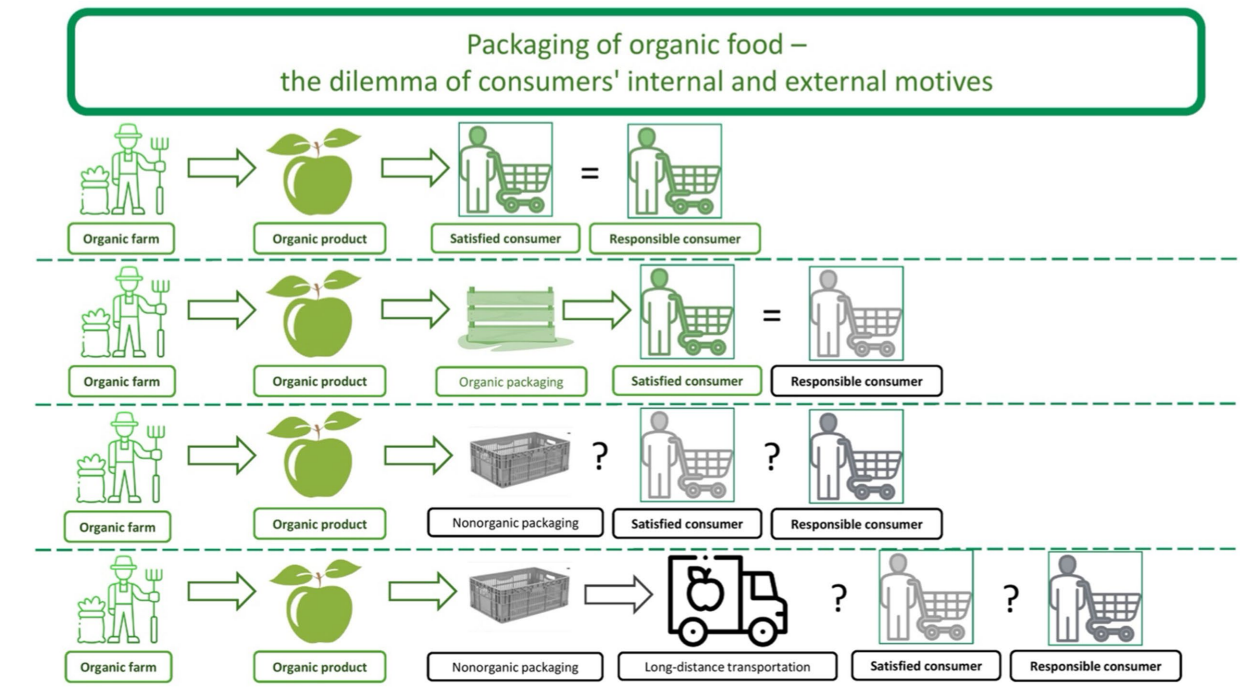
This study provides empirical insights to clarify consumers' motives for choosing organic food and the importance of the packaging of organic food in shaping consumers' perceptions of food organicity. Based on a survey of 497 consumers of organic food in Ukraine, we investigate the extent to which organic packaging can serve as an indicator of external (altruistic) consumers' expectations and whether the environmental friendliness of consumer choice is related to their expectations of sustainability (greenness) of organic food at all stages of their life cycle. We have found that there is no clear distinction between internal and external consumer motives in the perception of food organicity due to the perception of packaging organicity as part of food organicity. However, organic packaging can be an indicator of external (altruistic) consumer motives, subject to the limitations that organic packaging is less related to health care and more to altruistic motives. Consumers driven by external motives may expect produce to be organic at all stages of their life cycle and are more likely to rely on the producer's commitment to environmental responsibility. Organic producers should consider this in their marketing strategies to meet consumer expectations and avoid the risk of greenwashing. Our results can serve as a starting point for further exploration of ways to foster mutual understanding between consumers and producers regarding shared environmental responsibility.

KEYWORDS

packaging of organic food, consumers' expectations, organic food life cycle, organic producers, sustainability, green marketing, greenwashing

1 Introduction

The focus of researchers on studies related to the behavior of organic food consumers continues to grow. This interest is explained by the numerous dilemmas that arise in the process of rethinking both the motives of consumer behavior and strategic decisions related to the formation of food policies and meeting the interests of a society focused on sustainable development. Many recent studies reflect an important trend to find links between the consumption of organic food and the motives that drive consumers to do so. The study Singh and Khanwani (2023) and Krsnik and Erjavec (2024) develops a shift from demographic to psychographic criteria that determine environmentally conscious consumer behavior. Psychographic criteria for the consumption of organic food in many studies are associated with the existence of egoistic and altruistic motives in consumer behavior. As a rule, egoistic motives are understood to be related to the care for one's own health (Iyer et al., 2016), and altruistic motives to be related to the concern for the environment (Birch et al., 2018; Xu et al., 2021). The main debate is centered on the dilemma of what ultimately determines consumer



GRAPHICAL ABSTRACT

choice: internal security through the perception of organic food as safe and healthy, or external motivation through self-awareness of social benefit and social responsibility. Among the nine motives for purchasing organic food examined in Hughner et al. (2007), health and environmental concerns are also at the top of the list. Although there is still insufficient evidence that organic food is more nutritious (Pawar et al., 2022), some studies, for example Magnusson et al. (2003) suggest that egoistic motives are winning the battle for the best predictor of organic food purchase, putting personal health first compared to environmental concerns.

Increasingly, researchers are going deeper in their studies, paying attention to the motives of consumption, differentiating between egoistic and altruistic (Hansen et al., 2018), or in terms of human health, animal health (Hölker et al., 2019) and environmental impacts (Magnusson et al., 2003). For example, a study of Hansen et al. (2018) shows the relationship between organic food identity and consumers' personal values. The researchers showed a positive correlation between identity and the egoistic motive (understood as taking care of one's own health) and no correlation between the altruistic motive (understood as environmental awareness), which also proved the dominance of egoistic motives over altruistic ones in the formation of organic food identity.

Although many studies have highlighted environmental concerns (Steg and Vlek, 2009; Penz et al., 2019; Zammitti et al., 2023), as a motive for consumers to choose organic food, it remains unclear whether the altruistic motive is clearly understood by consumers and producers alike. Our starting point for the study is a couple of trivial questions: what makes a product "green," organic food "organic," and what kind of understanding exists between the consumer and the producer in this context? The preliminary literature review sheds some light through interpretations of the green marketing concept. Some authors (Sarkar, 2012; Reddy et al., 2023) consider green marketing as a promotion strategy based on the greenness of one of the 4Ps or a particular stage of the product life cycle. Accordingly, either the food or service itself is environmentally friendly, or the production process or packaging is modified to be more environmentally friendly. Given that organic production is subject to globalization trends (Hempel and Hamm, 2016a,b), in some European countries demand exceeds supply, which leads to the need to import organic food, which automatically raises the issue of logistics costs and calls into question the environmental benefits of such food. On the other hand, previous studies have shown that consumers often perceive local food as healthier and of higher quality, associating them with all the attributes of organic food (Jensen et al., 2019; Campbell et al., 2013; Abouab and Gomez, 2015; Ditlevsen et al., 2020). Thus, consumers demand food with health benefits, and the food industry, for its part, tries to meet the needs of large food sectors that see health as a potential growth area (Lang and Heasman, 2015). But is not a company that positions its produce as "green" or "organic" in this case involved in greenwashing? When offering a consumer, for example, to buy certified organic food delivered from another continent, is the seller misleading its consumer by claiming that they are organic and environmentally friendly, which the consumer may associate with a less destructive impact on the environment? Or, for another more obvious example, organic food sold in non-organic packaging (fresh organic berries in a plastic box), would this not be another example of abuse of consumer trust? In this context, we would like to focus on the packaging of organic food in

Abbreviations: EU, European Union; FA, Factor Analysis; SPSS, Statistical Package for the Social Sciences; EFA, Exploratory Factor Analysis; CFA, Confirmatory Factor Analysis; KMO, Kaiser-Meyer-Olkin Test; EACEA, European Education and Culture Executive Agency; GMO, Genetically Modified Organism; 4P, Product, Price, Place, Promotion; UAH, Ukrainian Hryvnia.

relation to altruistic (external) and egoistic (internal) motives of consumer behavior. The motivation for this study is based on contemporary environmental challenges that require society and businesses to reduce the negative impact of packaging on the environment. The European Union is actively developing policies and regulatory frameworks to address these challenges. In particular, Directive 94/62/EC on Packaging and Packaging Waste (European Parliament and Council, 1994) establishes general requirements for the sustainability of packaging, including its recyclability, reusability, and biodegradability. Additionally, Directive (EU) 2019/904 with European Parliament and Council (2019) emphasizes the importance of reducing the environmental impact of plastic products, requiring a gradual transition to more environmentally friendly alternatives, including biodegradable packaging. Positive developments in this direction are also taking place in Ukraine. Current reforms aim to harmonize national legislation on packaging and packaging waste management with European standards. The Draft Law of Ukraine on Packaging and Packaging Waste (No. 10066–2) with Verkhovna Rada of Ukraine (n.d.) proposes the establishment of a packaging management system based on the principles of a circular economy, marking a significant step towards alignment with European policies. Based on the directives and aligned with the discussion in Turkcu et al. (2022), "organic packaging" is defined as packaging materials that reduce the environmental impact throughout their life cycle. This includes recyclable, biodegradable, and compostable materials, as well as biobased plastics derived from renewable sources such as corn, sugarcane, or cellulose. Additionally, this definition encompasses non-plastic materials like paper or bamboo, provided they meet environmental sustainability criteria such as minimal greenhouse gas emissions, resource efficiency, and safe end-of-life disposal options. Biobased and biodegradable plastics, as well as paper and cardboard, are often considered ideal materials for organic packaging due to their lower environmental impact compared to conventional plastics (Caspers et al., 2023).

Nowadays, there are a lot of studies researching consumer attitudes towards organic packaging (Akin et al., 2023). In their paper Espinosa-Brisset et al. (2023) on consumer perceptions of fruit production and processing technology, they present survey results showing that most consumers indicate that organic food helps to preserve the environment. On the other hand, for both fresh and processed food, consumers consider the availability of packaging to be a minor problem, but the presence of packaging itself, along with the use of additives and loss of nutritional value, are considered to be disadvantages of processed food. This leads to the assumption that for a consumer of organic food, processing conditions and organic packaging will be more important than production conditions. It turns out that the importance of organic production for the consumer is lost at the processing stage, while the importance of organic packaging is increasing. Another aspect of the importance of organic food packaging is its information component. A study Chiew et al. (2023) shows the importance of ecolabels in predicting consumer intentions to buy organic food. Researchers view packaging as an element of supporting a sustainable consumption model, which makes packaging an important link not only in terms of communicating the benefits of organic food, but also in terms of consumption culture itself. However, consumer motivations for organic packaging vary. Some studies Koch et al. (2022) suggest that economic benefits, such as efficient use of resources, and normative motives, such as societal expectations, prevail over hedonic motives, such as emotional aspects of environmentally friendly behavior, when choosing eco-friendly packaging. However, the authors studied consumer behavior in online retail, which does not take into account the health aspect. A study of consumer behavior in the field of food packaging (Jurconi et al., 2022) has found a correlation in the understanding of 280 respondents of eco-friendly packaging as an opportunity to live in a less polluted environment. The issue of consumer awareness in identifying eco-friendly packaging materials also remains open. According to Nguyen et al. (2020) knowledge of packaging materials production technology remains low, and market attractiveness (design and good price) is considered a criterion for choosing environmentally friendly food packaging. Nevertheless, the results of the focus group discussions have shown that consumers are ready to adjust their consumption behavior towards environmentally friendly one. The market attractiveness of packaging in terms of its design is also mentioned in an earlier study Frýdlová and Vostrá (2014), according to which consumers mentioned this criterion as influential when choosing organic food along with health effects.

These research results indicate that there are at least three gaps in understanding consumer behavior in the field of organic food and their packaging. First, the clear motives for the choice remain unclear, namely: when buying organic food, is the consumer more inclined to take care of their own health or to take care of the environment? The first gap is likely to lead to the second uncertainty: is organic packaging considered equally important in shaping consumer perceptions of food organicity (given that organic packaging is less related to health concerns and more related to altruistic motives)? And finally, the dilemma that arises as a result: should the consumer be responsible for the environmental friendliness of their choices? By responsibility for environmental friendliness, we mean the consumer's expectations concerning the sustainability of organic food at all stages of their life cycle. By addressing these gaps, this study aims to contribute to a deeper understanding of consumer behavior. It also seeks to inform strategies to align consumer expectations with the principles of organic food development and sustainable packaging practices.

This study aims to find empirical answers to these gaps. The research objectives (RO) of this article are:

RO (1): To analyze the primary motives behind consumer choices for organic food, distinguishing between health-related (internal) and environmental (external) factors.

RO (2): To examine the influence of packaging on consumer decisions regarding organic food and evaluate how this role varies based on internal or external consumer motives.

RO (3): To investigate consumer expectations regarding the sustainability of organic food throughout their life cycle and their alignment with perceived personal responsibility for environmental sustainability.

The problem addressed in this study centers on the lack of a clear understanding of how consumer motives-both internal (health-related) and external (environment-related)-interact in shaping perceptions of organic food, particularly the role of organic packaging in these perceptions. This uncertainty creates challenges for producers in aligning marketing strategies with consumer expectations and risks exacerbating issues such as greenwashing. By examining the interplay between these motives and the sustainability expectations throughout

a product's life cycle, this study aims to fill a critical gap in the literature and provide actionable insights for stakeholders.

This research investigates consumer attitudes toward organic food without focusing on specific categories. The term 'organic food' was understood broadly by respondents as any goods labeled and marketed as organic. The surveys were conducted in supermarkets, allowing consumers to base their responses on organic items commonly available to them during their shopping experiences. This approach provides a general understanding of consumer perceptions without limiting the scope to a specific product category.

The structure of the paper is as follows: the second section describes the methodology, including survey design, target audience, and data collection process. In the third section, the results are presented, focusing on consumer perceptions of organic food, the role of packaging, and sustainability expectations. In the fourth section, the findings are discussed in the context of existing literature and their implications for stakeholders. Finally, in the fifth section, the study's contributions are summarized, and directions for future research are suggested.

2 Materials and methods

2.1 Study design and research framework

This study was designed to investigate motivational aspects of consumer behavior related to organic food, focusing on three key areas: (i) consumers' perceptions of food organicity; (ii) the role of packaging in shaping consumer choices; and (iii) expectations of sustainability throughout a product's life cycle. The research was conducted using a structured survey targeting a representative sample of 497 consumers from four Ukrainian cities (Kyiv, Odesa, Lviv, and Sumy), selected for geographic diversity. The survey comprised 33 questions, divided into blocks that explored socio-demographic characteristics, perceptions of organicity, attitudes towards packaging, and expectations of sustainability. Responses were collected through in-person interviews using digital questionnaires, ensuring accessibility and accuracy.

To analyze the collected data, we employed factor analysis to identify and differentiate internal and external consumer motives. This method allowed us to explore the relationships between respondents' motivations and their perceptions of organic food and packaging. Additional statistical techniques, such as correlation analysis, were used to link socio-demographic factors with behavioral patterns. The study's robust design ensured comprehensive insights into the interplay between consumer expectations, environmental responsibility, and the role of packaging in organic food selection.

2.2 Survey description and questionnaire design

We conducted a survey of the population of Ukraine to investigate the motivational aspects of consumer behavior towards organic food in the context of (i) perception of their organicity; (ii) importance of packaging; (iii) importance of sustainability (greenness) of products at all stages of the life cycle. The data was collected through a survey of consumers in supermarkets in four Ukrainian cities (Kyiv, Odesa, Lviv and Sumy). The survey was performed exclusively in large cities of Ukraine due to the following considerations: availability of certified organic food and higher purchasing power. In Ukraine, certified organic food is predominantly available in large cities, where supermarkets and specialized stores stock a broader range of such items. Smaller towns and rural areas often have limited access to certified organic food, which would have restricted our ability to collect data on consumer behavior. Certified organic food is generally more expensive than conventional ones, making them more accessible to consumers with higher income levels. Large cities typically have a higher average income and purchasing power among residents compared to smaller towns and rural areas. This ensures that the surveyed population is more representative of actual consumers of certified organic food in Ukraine. The main criterion for selecting the supermarket was the availability of organic food in the stock. Surveys were conducted in supermarkets where respondents interacted with a range of organic-labeled food. The term 'organic food' was deliberately left open for interpretation to capture general attitudes toward organic food. This approach allowed us to investigate overarching consumer perceptions without limiting the study to a specific product category. Respondents were selected randomly. Each respondent was asked to fill out a Google questionnaire with 33 questions on a tablet or on their own mobile device (Supplementary Table A1), which took 15 min on average. Due to the length of the survey, the main criterion for choosing consumers was the availability of free time and the willingness to participate in the survey. This survey was conducted in October–December 2023. The cities for the survey were chosen to be geographically representative of the sample, covering the center, east, west, and south of the country. When estimating the proportions of the sample, the total population of Ukraine was considered (sampling error ± 5% and credibility level 95.5%), the final sample size was 497 respondents. In order to ensure clarity during the interview, as well as to preliminarily estimate its duration, we used a pilot survey with 15 people before conducting research in the field. The questionnaire contained 4 blocks: general block - socio-demographic characteristics of respondents; block 1 - *"What food does the consumer consider organic?"* (3 multiple-choice questions, 5 questions with single choice); block 2 - *"What place does the consumer give to packaging when choosing organic food and does his/her choice depend on his/her motives (internal or external)?"* (1 question with multiple choice, 12 questions with single choice); block 3 - *"When buying organic food, does the consumer expect them to be organic at all stages of their life cycle?"* (5 questions with single choice). This questionnaire was used to identify the general context for the three blocks and to conduct an aggregate analysis of the relationship between conditional variables and respondents' answers to blocks of questions.

2.3 Factor analysis of internal and external motives (i) perception of organicity; (ii) importance of packaging; (iii) importance of sustainability ("greenness") of food at all stages of the life cycle

To analyze internal and external motives, we used factor analysis (FA). We considered various constructs and conducted an exploratory factor analysis, adapting respondents' answers to our research context (Supplementary Table A2). The FA was calculated in SPSS using the Principal component method with the estimation of the components

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of the correlation matrix and Varimax with Kaiser Normalization rotation by analyzing the components of the correlation matrix with absolute values of the components greater than 0.32 (Finch, 2020). We expected to get two factors that would correspond to the internal and external motivation of consumers. But the results with a limited selection of factors of 2 showed that the cumulative variance was only 50.2%. Thus, we removed the constraints and obtained three different factors (external motives, internal motives, mixed motives) that accounted for 70.7% of the cumulative variance.

2.4 Sample description

The socio-demographic characteristics of the sample and the population of Ukraine (Demographic Passport, 2023) are compared in Table 1. The sample was representative for the population in terms of age and level of income; partially representative in terms of marital status and place of residence. However, it should be noted that male respondents are underrepresented, which can be explained by several factors. First, the tradition of household purchases (women are more likely to visit supermarkets than men); second, many Ukrainian men aged 25 to 60 are currently mobilized. Also, the sample is characterized by an overrepresentation of respondents with higher education, but our sample is not an exception; similar trends are inherent in many empirical studies (Pérez y Pérez and Gracia, 2023; Verhoef, 2005) and can be explained by the fact that respondents with higher education are more likely to agree to be interviewed.

Thus, 75.3% of the sample were women. Most of the respondents were aged 18 to 49, live in large cities, have higher education, their average income ranges from 10 to 40 thousand UAH, mostly live with their families and have a child. Since one of the hypotheses of our study was to test the correlation between social and civic activity and the formation of motives for using organic packaging, we added questions about public activities and social activism of respondents to the standard questions of the socio-demographic profile. According to the survey, 41.5% of respondents said they were actively involved in social and civic activities, while 39.4% were not.

Socio-demographic characteristics are classified as conventional variables. As Table 2 shows, the coefficient of variation for each conditional variable is greater than 0.15, but the standard deviation for such variables as gender and living situation is less than 0.7, which indicates that these variables do not contain sufficient variation and are not significant for analyzing their impact on the search for internal and external motives in respondents' answers. Therefore, in order to avoid bias in our analysis, we used the criterion of variability (Holt and Smith, 1979). The variability of all other conditional variables, including public activities and social activism, can be considered sufficient to find such links.

TABLE 1 Socio-demographic characteristics of the sample and the population of Ukraine.

	Sample	Ukraine statistics[1]
Population	(n = 497)	(n = 41.13 million)
Gender (in %)		
Male	24.7	46.4
Female	75.3	53.6
Age (in %)		
18–29	35.4	18.4
30–39	22.8	24.1
40–49	27.6	21.6
50–59	9.6	19.7
60–70	4.7	16.9
Living situation (in %)		
Big city (>200 000 inhabitants)	56.3	45.8
Small town (<200,000 inhabitants)	31.9	23.9
Countryside	11.8	30.3
Education (in %)		
Complete general education	16.3	22.3
Vocational education	4.9	26.3
Higher education	78.9	51.4
Income (in %)		
Below 5000 UAH per month	17.9	15.7
Between 5001 and 10 000 UAH per month	18.9	33.5
Between 10 001 and 20 000 UAH per month	33.3	32.2
Between 20 001 and 40 000 UAH per month	20.9	12.5
Above 40 001 UAH per month	8.9	6.1
Marital status (in %)		
I live alone	13.2	18.2
I live with my family	36.0	11.6
I live in a couple	16.9	32.4
I live in a couple and have children	33.9	37.8
Public activities and social activism (in %)		
I take an active part in social activities	41.5	n/a
I am socially active only during elections	19.1	n/a
I do not take an active part in social activities	39.4	n/a

Data expressed in percentage (%). *Not available: n/a. Demographic Passport (2023)[1].

3 Results

3.1 Consumers' understanding of organic food

This set of questions included a study of consumers' understanding of the category "organic food." Thus, most consumers understand organic food to be grown without synthetic fertilizers and pesticides, certified properly, and grown without the use of GMO seeds (Figure 1). Less than half of respondents consider food to be organic if it is grown using organic fertilizers (37.2%) and sustainable farming methods (36.6%). Characteristics such as organic packaging and production by local farmers are the least associated with consumers' identification of food as organic (25.8 and 16.1%, respectively).

To the question "How do you check whether food is organic?" 64.8% of respondents answered that they looked at the labeling on the package, 32% did not check at all, and 3.2% asked to see a certificate. Despite the fact that *organic packaging is not a decisive characteristic*

for consumers, its presence and information content proved to be important for the majority of respondents.

The control question ranking the criteria for defining a food as organic by importance to the consumer confirmed the results, identifying the most important factors as the absence of chemical pesticides and the ban on the use of GMOs, special certification marks and a logo. Origin and trust in the producer were of medium importance. The question about the place of purchase of organic food revealed an almost proportional distribution between supermarkets (38%), specialized stores (25.2%) and local farms (23.3%). Only 13.5% of respondents stated that they did not buy organic food at all. Given that the survey was conducted in conventional supermarkets and the respondents were not previously identified as consumers of organic food, such a high percentage of organic consumption among Ukrainian consumers demonstrates a high level of interest. The country of production of organic food is not important for the majority of consumers (59%) when making a purchase, while the group of consumers who buy organic food only locally is also significant - 37.8%, and only 3.2% of consumers prefer imported organic food.

Despite the fact that 78.7% of all respondents believe that the production of organic food causes less damage to the environment, when asked "Which food is more organic for you?" only 20.9% said that the production and sale of which had minimal environmental impact, and 79.1% of all respondents considered food that was more beneficial (safe) for health to be more organic. In other words, there was a predominance of internal motives when choosing organic food. Among those consumers who were guided by external motives (i.e., chose organic food because it caused less environmental damage), 61.8% believed that organic production caused less environmental damage by reducing the amount of toxic substances released into the environment, 18.8% believed that organic production contributed to biodiversity and better supported ecosystems, 12.3% associated it with increased soil fertility and reduced soil erosion, and *only 7% drew attention to the reduction of packaging waste.*

TABLE 2 Population descriptive statistics.

Conventional variables	N	Mean	Std.	Variance
Gender	497	1.73	0.43	0.19
Age	497	2.26	1.17	1.37
Living situation	497	1.56	0.69	0.48
Education	497	2.63	0.74	0.56
Income	497	2.85	1.20	1.45
Marital status	497	2.71	1.07	1.14
Public activities and social activism	497	1.98	0.9	0.8

Std. Deviation and Variance use N rather than N-1 in denominators.

3.2 Role of packaging in consumer decisions

The questions in this block were aimed at identifying consumer habits and peculiarities of consumer behavior regarding organic packaging. The results showed that the culture of waste sorting is still not widely accepted. Only 44.5% of consumers have a strong sorting habit, 49.1% sometimes sort, and 6.4% never sorted at all. However, 61% of consumers indicated that they were in the habit of using reusable shopping bags when shopping, 18.7% preferred paper or biodegradable bags, and there is still a group of consumers who continue to buy bags in the store every time they shop and do not pay attention to the material of the bag. Studying the information on the packaging turned out to be a habit for 50.9% of respondents, while only 2.2% do not pay attention to the packaging to study product information at all. Sustainability of packaging proved to

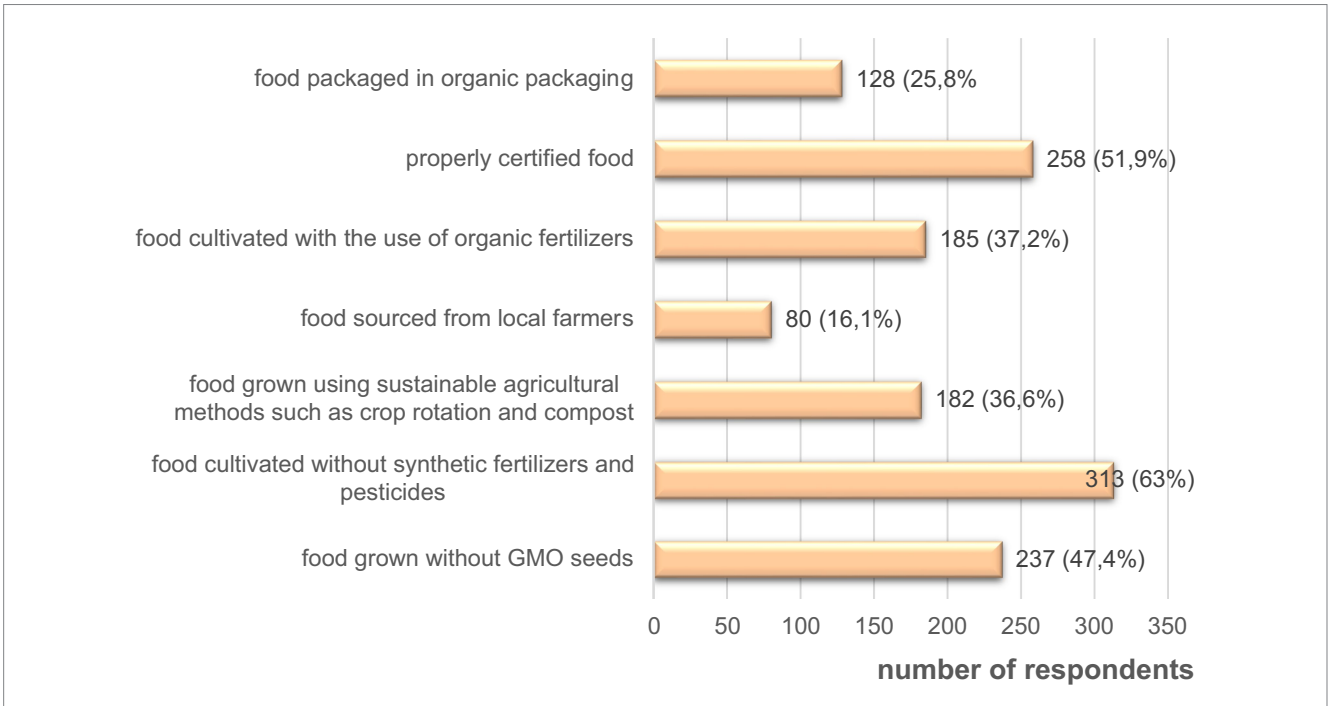

FIGURE 1
How do you understand the category of "organic food"?

be important for the majority of respondents among the general characteristics of packaging (Figure 2). 87.5% believe that organic packaging contributes to the preservation of the environment.

Consumers consider packaging to be organic for 44.3% because it is recyclable, for 27.2% because it reduces the use of plastic, for 26.6% because it does not contain harmful substances, and for 2% because of other characteristics.

The presence of organic packaging when choosing specific brands influences the purchase decision in 23.1% of cases, and for 30.4% of consumers, their loyalty to a particular brand outweighs their interest in organic packaging. To the question "If you are offered to buy organic berries in plastic packaging, what will you do?" 57.5% of respondents answered that they bought berries because they considered them organic, 33.4% said they would buy the food if the producer changed the packaging to eco-friendly, and 9.1% said that such behavior of the producer was a manifestation of greenwashing (thus, the percentage of respondents who consider the organic nature of the packaging to be part of the organic nature of the food itself was identified). Among all respondents, 46.3% of them noted their awareness of the concept of greenwashing, and after it was explained in the next question of the questionnaire, 47.9% of respondents recognized it as a violation of their consumer rights. The transition to organic packaging is considered important for producers by 78.1% of respondents, while 36.6% of respondents are willing to pay additional costs for organic packaging. And finally, 73% expressed their willingness to change their consumer habits in favor of organic packaging.

3.3 Sustainability expectations across the life cycle

The purpose of this set of questions was to identify consumer expectations regarding the organic nature of a food at all stages of its life cycle. In answering the question "How important is it for you that organic food is organic at all stages of its life cycle (growing, processing, transportation, packaging, consumption)" 42.1% of respondents indicated the highest degree of importance, and only 5% of respondents considered that characteristic to be of little or no importance (Figure 3).

To the question "Is it important for you that the packaging of organic food is also environmentally responsible?" 75.1% of respondents answered positively. However, the results of answers to the control question "How often do you pay attention to information about the environmental and social responsibility of the food producer?" (only 10.5% always pay attention, 47.1% usually do, 35.4% rarely do, 7% never do) suggest that consumers think about the environmental friendliness of packaging only if someone draws their attention to the importance of organic packaging as part of the product's overall environmental friendliness. Thus, by purchasing organic food, consumers can automatically consider the food organic at all stages of their life cycle. This is also confirmed by the results of respondents' answers to the question "If you had information that transportation of imported organic food leaves a large carbon footprint, would you continue to buy such organic food?" (41.6% of respondents answered negatively).

3.4 Aggregate analysis of the correlation between conditional variables and respondents' answers by question blocks

Table 3 shows an aggregate analysis of correlations between conditional variables and respondents' answers by question blocks. Respondents' age turned out to be the most influential conditional variable for all blocks. Our study is not exceptional and is in line with the results obtained in previous studies, e.g., (Magnusson et al., 2003). For younger consumers, organic food was most often associated with

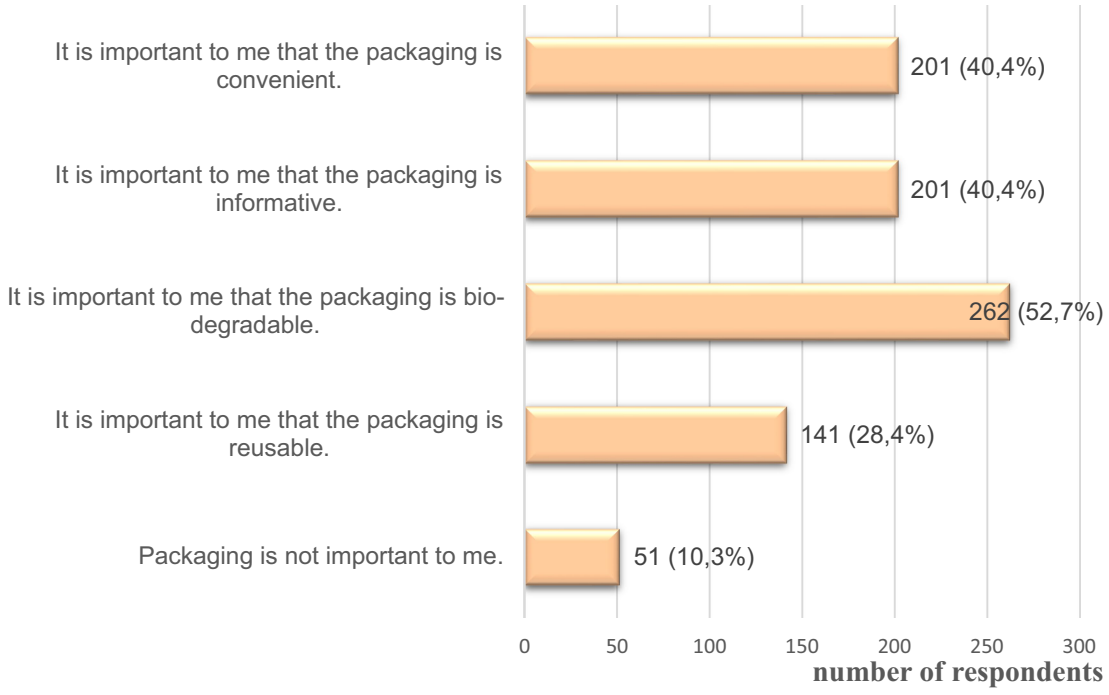

FIGURE 2
Which of the characteristics listed below is important to you in packaging?

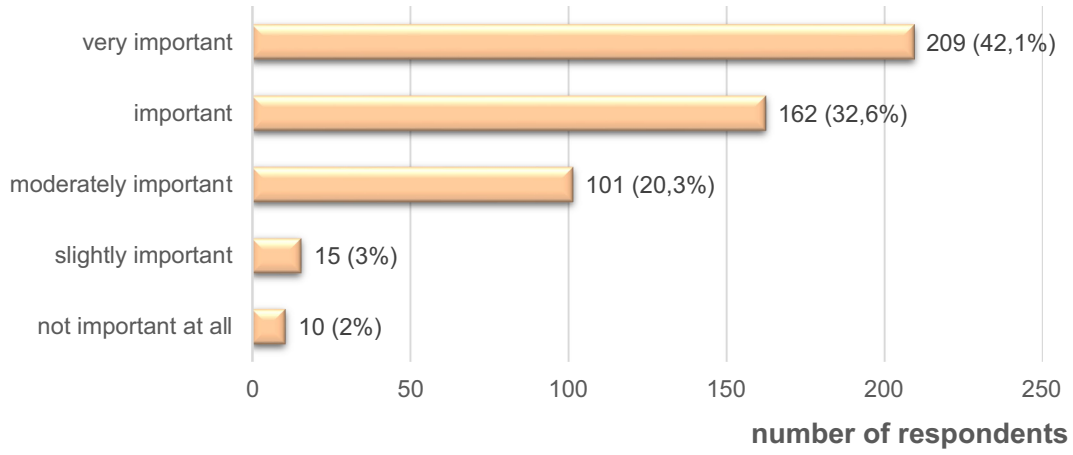

FIGURE 3
How important is it for you that organic food are organic at all stages of their life cycle (cultivation, processing, transportation, packaging, consumption)?

being grown without GMO seeds, by local farmers, and with organic packaging. The negative correlation coefficient of 0.494 indicates that younger people are more likely to pay attention to the environmental and social responsibility of a food producer, while older people are more likely to expect the producer to be sustainable at all stages of the life cycle (the partial correlation coefficient was positive at 0.316). In addition, younger consumers are more likely to sort their garbage, more likely to prefer food that come in organic packaging and are more willing to change their consumption habits in favor of organic packaging. This partially coincides with the results of the Funk et al. (2021) study, where the segment of "consistent pro-environmental consumers" more often included younger people, as well as with the results of an earlier study (Adamczyk and Adamczyk-Kowalczuk, 2022), which adheres to the opinion that younger people are more sensitive to environmental issues.

The level of education has also proven to be significant in shaping consumer expectations regarding the sustainability of organic food at all stages of their life cycle (Block 3). The study Hüppe and Zander (2021) describes a group of consumers called "organic traditionalists" who care for the entire value chain of organic food, including not only production and processing, but also environmental impact, energy costs, and logistical feasibility. In our study, respondents with a higher level of education were also more likely to expect a producer to be sustainable at all stages, from production to packaging. Also, the level of education had a certain level of correlation with the understanding of organic food as those grown with organic fertilizers and certified properly (Block 1). Consumers' interpretation of the term "organic" in our study showed quite significant differences by age and education. As Hughner et al. (2007) noted consumers can understand organic food in different ways and attach different contextual meanings to them. But in contrast to previous studies (Çoşkun and Kayışoğlu, 2018; Moruzzo et al., 2020), which tend to emphasize consumer skepticism about certification, our study finds greater trust among consumers with higher levels of education in labeling and certification.

The level of income proved to be the most influential in determining the willingness to pay extra for food in organic packaging. Respondents with higher incomes were more likely to choose packaging based on biodegradability criteria, while for respondents with lower incomes, the criterion was reusability (Block 2). In addition, the level of income proved to be significant when purchasing organic food in plastic packaging. People with higher incomes were more likely to refuse to buy organic food in plastic packaging and were also more likely to pay attention to the social responsibility of the food producer. Such results are supported by recent findings in a study of Hansen et al. (2018), which found a negative relationship between organic food identity, which in the study was defined as a person's self-definition of the role of an organic food consumer, and income. However, for example, in a study of Iyer et al. (2016) price and cost were not associated with intentions to buy green food (the study was conducted on the example of cosmetics), although environmental and social awareness were recognized as driving motives.

Marital status was more related to consumers' expectations regarding the sustainability of organic food at all stages of the life cycle (Block 3). Respondents with children were more likely to consider organic packaging as an important stage in the life cycle of organic food. An earlier study Wilson (2011) noted that many families start buying organic food with the arrival of a child, and our results extend this by providing information that families with children are more likely to take organic food more seriously, paying attention to organic packaging. A certain correlation was also observed in consumers' understanding of organic food depending on their family status (Block 1). For example, respondents who had children often mentioned personal acquaintance with and trust in the producer as the most important criterion, while for single consumers, the presence of certification marks on the packaging was the most important.

Public activity and social activism were also identified as a significant conditional variable in determining the role of packaging for the consumer (Block 2). This conditional variable was positively related to the perception of organic packaging as contributing to the preservation of the environment. Respondents who identified themselves as socially active were more likely to agree to fight against greenwashing and almost always paid attention to the social responsibility of organic producers. Again, the study of Hansen et al. (2018) rightly notes the existence of a negative correlation between social consciousness and consumer behavior towards organic food, referring to the tendency of consumers with lower social consciousness to focus more on selfish motives, with a greater degree of disregard for altruistic values related to environmental preservation. In

TABLE 3 Correlations.

Conventional variables	*Block 1* "What food does the consumer consider organic?"	*Block 2* "What importance does the consumer give to packaging when choosing organic food, and does their choice depend on their motivations (internal or external)?"	*Block 3* "When purchasing organic food, does the consumer expect them to be sustainable at all stages of their life cycle?"
Age	−0.228	−0.244	−0.494
Education	−0.178	−0.058	−0.294
Income	−0.132	−0.220	−0.152
Marital status	−0.252	−0.018	−0.282
Public activities and social activism	0.204	0.468	0.044

Missing value handling: PAIRWISE, EXCLUDE. C.I. Level: 95.0.

our study, the highest correlation among the partial variables in Block 2 was observed on the part of respondents with regard to consumers' assessments of the social responsibility of producers. In Block 1, the strongest correlations by partial variables were found in consumers' perception of organic food as less harmful to the environment. Among the most positive ones, socially active respondents were more likely to mention a reduction in the amount of toxic substances released into the environment and a reduction in packaging waste. Similar results can be found in the study of Iyer et al. (2016), where consumers' environmental awareness is noted as being directly related to green purchase intentions.

3.5 Results of factor analysis of internal and external motives (i) perception of organicity; (ii) importance of packaging; (iii) importance of sustainability ("greenness") of food at all stages of the life cycle

We start by testing the hypothesis that there are distinct motives in the behavior of organic consumers and use CFA, setting the number of factors to two and not using factor rotation. The results with a limited choice of factors of 2 have shown that the cumulative variance is only 50.2%. Thus, we switched to using EFA to determine the number of factors based on eigenvalues and the percentage of variance explained. The analysis of the correlation matrix and the value of its determinant, which is greater than 0.00001, showed the absence of multicollinearity. The results of Bartlett's Test and KMO Test are also acceptable (Table 4) for determining the reliability of the factor analysis results (Beavers et al., 2019). In the table of factor loadings, we left the values of the components greater than 0.3.

The explanation of the total variance showed that the three factors explained 70.7% of the correlations. Factor 1 (external motives) contributes 36.1% to the total variance; Factor 2 (internal motives) contributes 23.7%; Factor 3 (mixed motives) contributes 10.9%. Thus, our initial hypothesis about the existence of a two-factor model was adjusted, and as a result, an additional factor of motivational behavior was identified, the elements of which could not be clearly linked to external or internal motives in the behavior of organic food consumers. It concerned the perception of organicity and the importance of organic packaging. In addition, we were able to make sure that external motives prevailed in terms of the importance of product sustainability at all stages of the life cycle, which was confirmed by the partial factor loadings and the value of the total variance.

4 Discussion

4.1 Internal and external motives in the perception of organic food

In the perception of organic food, concern for one's own health was more influential than concern for the environment. When choosing organic food, consumers were mostly guided by internal motives, associating organic food with benefits for their health. These results are supported by several previous studies (Zanoli and Naspetti, 2002). In addition, Hansen et al. (2018) pointed out a positive relationship between organic food identity and selfish motives by studying the behavior of 1176 Danish consumers. Also, an earlier study of Swedish consumer behavior (Magnusson et al., 2003) identified concern for personal and family health as the main predictor of intention to buy organic food. We have also found that organic packaging is not necessary for the perception of food organicity, a finding that can be found in Koch et al. (2022). This finding is likely to be a reflection of the fact that consumers of organic food perceive organic packaging as part of the organic nature of the food.

4.2 Packaging sustainability as an indicator of external motives

In our research, we considered packaging sustainability as an external purchase motive that can reflect the consumer's desire to take care of the environment to a greater extent. However, factor analysis showed the prevalence of mixed motives in the perception of organic food. This is confirmed by the highest factor loadings for Factor 3 in the perception of organicity. Thus, the answer to the first question of our study, "what food do consumers consider organic," is that there is no clear distinction between internal and external consumer motives. It turns out that the consumer's simultaneous perception of organic food as both healthy and less harmful to the environment may subconsciously encourage the consumer to consider the packaging organic. This conclusion conceals the danger of manipulation of consumer behavior by organic food producers. Although it seems that consumers can clearly identify the motive for their behavior (internal, when they choose organic food because they are healthy, or external, when they choose organic food because they cause less damage to the environment), the lack of consumer perception of packaging sustainability as a separate element that contributes to the organic

TABLE 4 Rotated component matrix.

	Factor 1 (External)	Factor 2 (Internal)	Factor3 (Mixed)
(i) Perception of organicity			
PO1	***	0.729	***
PO2	0.603	***	***
PO3	***	***	0.856
(ii) Importance of packaging			
IP1	***	0.496	***
IP2	0.655	***	***
IP3	***	***	0.450
(iii) Importance of sustainability ("greenness") of products at all stages of the life cycle			
ISPSLC1	***	0.683	***
ISPSLC2	0.738	***	***
ISPSLC3	−0.746	***	***
Extraction Method: Principal component analysis. Rotation Method: Varimax with Kaiser normalization. a. Rotation converged in 5 iterations.			
Determinant	0.436		
Bartlett's test of sphericity	$p < 0.0001$		
Kaiser-Meyer-Olkin test of	0.673		

***Factor loadings < 0.3.

nature of the food calls into question the relevance of the request of those consumers who were guided by an external motive.

We found a completely different picture in the results of managing internal and external motives when assessing the importance of packaging as a separate element of food organicity. When we focused respondents' attention on the packaging of organic food, consumers seemed to be more clearly willing to be guided by external motives, preferring eco-friendly packaging over its convenience. Earlier, it was also reported that eco-friendly packaging can be associated by consumers as an external motive related to the opportunity to live in a less polluted environment (Jurconi et al., 2022; Wandosell et al., 2021). But, for example, unlike the study of Frýdlová and Vostrá (2014), which, along with health effects and environmental impacts of production, mentioned the design of packaging as a factor of purchase, our study found that consumers are more inclined to make their decision based on the environmental friendliness of packaging. Such results have certain limitations for comparison, as we did not take into account the attractiveness or design of the packaging in our study, but rather restricted it to its convenience and environmental friendliness as the criteria for distinction. The obvious differences between convenience and attractiveness may explain the discrepancy in the results. Thus, our research suggests that the environmental friendliness of packaging can be used to identify consumer motives more clearly. Again, taking into account the limitations that organic packaging is less related to health care and can be attributed to altruistic motives. Another limitation of our study should also be mentioned. It concerns the cultural peculiarities of consumer behavior related to subjective norms in collectivist cultures (Boobalan et al., 2022). Subjective norms in collectivist cultures emphasize the importance of social approval and group values. These norms encourage consumers to adopt behaviors that align with societal expectations, including environmental responsibility. For instance, consumers in collectivist cultures may prioritize eco-friendly choices not solely out of personal belief but also to conform to the perceived values of their community. We draw this conclusion based on the survey results showing that Ukrainian consumers are responsive to environmental narratives. While this tendency aligns with certain Western consumer behaviors, such as valuing sustainability, it also reflects the influence of collectivist cultural norms, where environmental responsibility is perceived as a collective good. However, we recognize that the cost factor, which plays a crucial role in Western markets, was not the focus of our study and requires further exploration to fully understand its interaction with these norms.

Another important conclusion we can draw from the survey results is related to the identification of a group of respondents (9.1% of the total sample) who considered the environmental friendliness of packaging to be part of the organic nature of the food itself. Such respondents pointed to the producer's behavior as a manifestation of greenwashing if organic food were packaged in non-ecological packaging. There was also another group of respondents, which made up 33.4%, whose respondents agreed to buy organic food only if the packaging was replaced with eco-friendly one. In response to the second research question, our results show that consumers of organic food may in some cases consider the environmental friendliness of the packaging to be part of the organic nature of the food itself, but the environmental friendliness of the packaging outweighs its convenience in most cases and can be seen as an indicator of external motives of consumer behavior. But this area also requires more specification, which creates room for future research that may choose to focus on other attributes of organic packaging.

4.3 Importance of sustainability across the product life cycle

Finally, we would like to discuss our third research question regarding the importance of food sustainability for consumers at all stages of the product life cycle. In the previous question, we already started this discussion by mentioning packaging. Here, we could observe an even greater predominance of a factor loading importance of the sustainability of organic food at all stages of their life cycle, even compared to the importance of environmental friendliness of packaging. It should be noted that prior to the survey, respondents were provided with explanations of the possible stages of the organic food life cycle, so their answers should probably be considered as different from their natural behavior, but that was our very goal. Once again, we were able to record changes in consumer decisions when the consumer had full information about the organic food, or rather, when we changed the focus of their attention. The country of origin of organic food was not important for the majority of consumers (59%) when making a purchase. However, 41.6% of respondents changed their minds when they learned that transportation of imported organic food leaves a large carbon footprint (Hüppe and Zander, 2021) were also able to identify a group of consumers for whom the entire value chain is important, but their results are more relevant to the processing stage of organic food. We tried to go even further, and not limit ourselves to the production process, but also take into account the peculiarities of eco-friendly

packaging and consumption, which also has common points with the study in this context (Penz et al., 2019). Thus, consumer expectations can probably give us a picture to strengthen the discussion on the responsibility of the producer to the consumer, who is guided by external motives in his consumption behavior and wants to act environmentally. For producers, this finding is likely to signal that strategic decisions within the bioeconomic context when monitoring product life cycle assessment indicators (Lago-Olveira et al., 2024; Magdalena et al., 2024) should meet consumer expectations and justify their trust.

In addition, conditional variables also contributed to this study. First of all, the age of the respondents was significant in determining the importance of eco-friendly packaging and their willingness to change consumer habits in its favor. These results indicate that the preference for sustainable packaging is likely to grow as the younger generation has more of a concern for global climate change issues (Wandosell et al., 2021) and is therefore guided by external motives in their consumer behavior. And in conclusion, we would also like to mention public activity and social activism of consumers (another significant conditional variable that we studied). This variable had a correlation with the respondents' willingness to fight greenwashing and monitor the social responsibility of organic producers.

4.4 Economic and regulatory context of organic packaging in Ukraine

Another critical aspect to consider is the relationship between organic packaging, regulations, and cost, particularly in the context of Ukraine's current economic situation. While organic packaging aligns with global sustainability goals, its adoption is often tied to compliance with international regulations and certification standards, which can increase production costs. This cost factor (Danko and Nifatova, 2022) is especially significant in Ukraine, where the economic challenges caused by recent events, including war and inflation, have reduced the purchasing power of many consumers. As a result, even though there is growing environmental awareness among Ukrainian consumers, the higher cost of organic food and packaging remains a barrier to widespread adoption.

These economic constraints (Zambujal-Oliveira and Fernandes, 2024) highlight the need for balancing sustainability with affordability. Producers must carefully navigate the trade-off between meeting regulatory requirements for eco-friendly packaging and ensuring their food remain accessible to the average consumer. Exploring subsidies, incentives, or partnerships to reduce the cost of eco-friendly packaging could be a practical solution.

For Ukrainian consumers, organic packaging often implies eco-friendly materials with minimal environmental impact during disposal. However, the EU perspective integrates broader considerations, including the use of recycled or reusable materials, alignment with stringent regulatory frameworks, and life cycle assessments to ensure that packaging materials contribute to a circular economy. Bridging these differences over the next decade will require increased public awareness campaigns in Ukraine, integration of life cycle analysis into consumer education, and harmonization of national policies with EU regulations. This alignment will help mitigate the risk of consumer misinterpretation by providing clearer standards for what qualifies as organic or eco-friendly packaging and encouraging rational, informed decision-making.

This interplay between cost, regulations, and consumer behavior represents an important dimension for further research.

5 Final conclusions

This study makes an additional contribution to clarifying the motives for consumers' choice of organic food and the importance of organic packaging in shaping consumer perceptions of food organicity. Based on the results of previous studies and our own survey, we find that the perception of food organicity is dominated by internal motives that are intended to associate organic food with health benefits. Organic packaging is not necessary for the perception of food organicity, which may be due to the fact that consumers perceive the organic nature of the packaging as part of the food's organicity. For this reason, there is no clear distinction between internal and external consumer motives in the perception of organic food. On the other hand, the organic nature of packaging outweighed its convenience in most cases and can be seen as an indicator of external motives for consumer behavior, taking into account the limitations that organic packaging is less related to health care and can be attributed to external (altruistic) motives. The importance of the sustainability of organic food at all stages of their life cycle prevailed in terms of importance in the formation of factor loadings for identifying external consumer motives, which further clarifies the picture of consumer expectations. Thus, in their external motives, consumers of organic food are likely to rely on the environmental responsibility of the producer. This finding suggests that organic producers should take this into account in their marketing strategies to meet consumer expectations. Our findings highlight that while internal motives dominate the perception of organicity, external motives-such as the environmental sustainability of packaging-also significantly influence consumer behavior. This dual perception blurs the distinction between internal and external motives and suggests that organic packaging can serve as a key indicator of altruistic consumer behavior, provided that producers meet the expectations of sustainability across all stages of a product's life cycle. This study attempts to extend the existing context to address the dilemma of consumer and producer responsibility for environmental choices by using organic packaging as an indicator of internal and external consumer motives. We take this as a starting point in our further search for understanding between consumers and producers.

Despite these contributions, the study is not without limitations. First, the data was collected exclusively from Ukrainian consumers, which may limit the generalizability of the findings to other cultural and economic contexts. Second, the study relied on self-reported data, which may be subject to biases such as social desirability. Third, the research investigated consumer attitudes toward organic food without focusing on specific categories. The term "organic food" was broadly understood by respondents as any goods labeled and marketed as organic, which may obscure category-specific preferences or attitudes that could significantly affect the findings.

Future research could expand the scope by examining cross-cultural differences in consumer motives or exploring the impact of socio-economic factors on perceptions of organicity. Additionally, investigating consumer attitudes toward specific categories of organic food, such as fresh produce, processed food, or beverages, could offer more granular insights. Analyzing changes in consumer preferences over time, particularly following the implementation of eco-friendly practices or market shifts, could provide a dynamic perspective on the evolving relationship between consumers and producers.

The results of this study are intended to provide an informational basis for developing practical recommendations for producers and

marketers on aligning their strategies with consumer expectations, fostering greater trust and transparency in the organic sector. In terms of practical implications, further studies could delve into the development of communication strategies that align with consumer expectations of sustainability and transparency. For instance, investigating the effectiveness of ecolabels or sustainability certifications in fostering consumer trust could provide actionable insights for producers and policymakers.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the [patients/participants OR patients/participants legal guardian/next of kin] was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

ON: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. KB-D: Writing – original draft, Data curation, Investigation, Resources, Visualization, Writing – review & editing. SC-P: Writing – original draft, Writing – review & editing. YD: Writing – review & editing, Supervision, Writing – original draft, Visualization.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsus.2025.1513954/full#supplementary-material

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