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Confidence in organic food: a cross-country choice based conjoint analysis of credibility factors

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The primary objective of this research is to examine the diverse product attributes related to the credibility of organic food. Given that organic quality of food products is considered a credence attribute, establishing credibility plays a pivotal role in consumers' decision-making processes when purchasing organic products. The lack of credibility represents a significant barrier to the growth of the organic market. Therefore, it is crucial to explore the specific product attributes that can enhance the perceived credibility of organic products. To assess the various factors influencing credibility, a choice-based conjoint method was employed. The study involved Hungarian participants ($n = 652$) and Polish participants ($n = 290$), who were asked to select a hypothetical product they deemed more credible. The findings reveal that the country of origin, appearance, and packaging exert the most substantial influence on the perceived credibility of organic food. Additionally, price and the place of purchase were identified as factors that also impact consumer perceptions.

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Introduction

Consumer trust in the food chain is a significant issue in contemporary society. Given that food is an integral part of everyday life, consumers are increasingly concerned about the quality and safety of what they eat. While certain characteristics of food, such as smell, taste, and appearance, allow consumers to make immediate judgments about its quality, there are other attributes that often go unnoticed, such as the presence of pesticides or the production methods employed. This information asymmetry between consumers and producers contributes to organic food being considered a "credence good" (Giannakas, 2002), which is challenging to trust. Consequently, many consumers, particularly in emerging markets (Nuttavuthisit and Thøgersen, 2017), remain sceptical about the authenticity of organic products.

Trust and credibility are strongly related to each other. According to Bentele and Seidenglanz (2008), credibility is a sub-phenomenon of trust. In the context of food products, credibility can be a feature of a product attributed by consumers. As Thorsøe et al. (2016) explains, food producers or retailers must be credible to generate consumer trust.

The credibility of organic food in Hungary and Poland assumes even greater significance given the historical and social context of former socialist countries. As indicated by social psychology research, the legacy of socialist regimes has left a lasting impact on institutional trust in these nations, with trust in governmental and public institutions found to be notably low (Delhey and Newton, 2003). The erosion of trust in state institutions during the socialist era resulted in citizens relying on private and informal networks to address their daily needs due to limited resources and services (Delhey and Newton, 2003).

In the case of organic food, the credibility of certification systems and labelling practices becomes a vital factor in rebuilding and strengthening consumer trust in the agricultural sector (Hughner et al., 2007). As consumers in Hungary and Poland are more likely to be sceptical of official institutions, having robust and transparent organic certification processes can serve as a means to assuage concerns and increase the uptake of organic products (Bryła, 2016). By fostering credibility in organic food production, these countries can work towards mitigating the deep-seated distrust inherited from their socialist past and promote sustainable agricultural practices that align with consumer demands for trustworthy and ethical food choices (Nuttavuthisit and Thøgersen, 2017; Zander et al., 2015).

Various factors impede the growth of the organic food market. Hungarian and Polish researchers have identified the high price of organic food as a significant barrier (Szente, 2004; Bryła, 2016; Jarczok-Guzy, 2018). While the health benefits associated with organic food are often acknowledged as a positive factor, low credibility in organic products poses an additional obstacle to market expansion (Nuttavuthisit and Thøgersen, 2017).

The most recent data of the Hungarian organic food market is from 2015, which valued it at €30 million, accounting for only 0.3% of the total food market, with per capita organic food consumption at €3/person/year (Willer et al., 2022). Although it can be assumed that these figures have increased since then, organic food consumption among Hungarian consumers remains relatively low.

In the case of Poland, data from 2019 indicates that the organic food market reached €314 million, representing 0.6% of the total food market. Annual per capita consumption was €8/person/year, which, although higher than the Hungarian average, still falls well below the averages of Western European countries. For instance, Austria has per capita consumption of €254/person/year, Germany has €180/person/year, and neighbouring Czech Republic consumes more than double that at €19/person/year (Willer et al., 2022).

Consumer's perceived credibility in organic food is crucial, given the perception that organic products are better for the environment, more sustainable, and healthier than conventionally grown alternatives (Wee et al., 2014). However, maintaining credibility in the organic food industry presents challenges. The certification process for organic products is often costly and time-consuming, leading some farmers and traders to mislabel their products as "organic" without adhering to the necessary guidelines. This deceptive practice erodes consumer trust in the industry as a whole. Additionally, incidents of fraud and mislabelling within the organic food industry contribute to consumer scepticism and doubts regarding the authenticity of organic products (von Meyer-Höfer et al., 2015).

Aim of research and hypothesis building

Credibility of organic food is influenced by various intrinsic and extrinsic factors. The aim of this research to quantify the effect of product-specific factors (e.g., packaging, price) and external factors (e.g., place of purchase), which might influence consumers' perceived credibility of organic food. Attributes were selected based on Nagy et al.'s (2022) literature review findings, where the following attributes were found to be the most influential: packaging (Danner and Menapace, 2020), appearance (Nuttavuthisit and Thøgersen, 2017), communication (Vega-Zamora et al., 2019), certification and country of origin (Pedersen et al., 2018), price (Lee et al., 2020) and place of purchase (Bonn et al., 2016).

Among these attributes, certification holds the greatest prominence. Certification involves evaluating organic food supply chain actors to ensure compliance with organic standards and regulations, thus serving as a key factor in consumer trust (Janssen and Hamm, 2012). Organic logo generally signals certification to consumers, and well-known logos can create trust (Janssen and Hamm, 2012), although Činjarević et al. (2018) argue that the logo alone may not suffice to establish credibility in the product, particularly in Central and Eastern Europe.

Certification was assessed combined with the country of origin, as organic food is usually certified in the country its coming from (Pedersen et al., 2018). Numerous studies indicate that organic food originating from developing countries is perceived as less credible compared to products from Western countries (de Morais Watanabe et al., 2020; Bruschi et al., 2015; Yadav et al., 2019; Lang and Conroy, 2021; Chen et al., 2019). According to Yin et al. (2019), consumer ethnocentrism can influence organic food credibility based on the country of origin.

Hypothesis 1 (H1): Consumers consider locally produced organic products more credible compared to imported organic products.

While limited evidence exists, product-level communication has the potential to enhance credibility in organic products (Vega-Zamora et al., 2019). Similarly, the appearance of organic food is believed to influence consumer perceptions. Lockie et al. (2002) demonstrated that processed organic food creates scepticism among consumers regarding its organic status. Communication of organic claims through packaging design, along with clear and accurate organic labelling, can increase consumers' perceived credibility in organic food products (Margariti, 2021).

Packaging is a relatively underexplored topic in current literature (Hemmerling et al., 2015). Danner and Menapace (2020) found that consumers in German-speaking countries perceive plastic-packaged organic fruits and vegetables as less credible. Similarly, Hemmerling et al. (2015) argue that packaging, despite providing information about the organic status of the product, is

often seen as environmentally unfriendly, contradicting the concept of organic food.

Hypothesis 2 (H2): Environmental-friendly packaging and natural appearance of the product positively influence organic products' perceived credibility.

The high price of organic food is a primary barrier to increased consumption (Hemmerling et al., 2015). However, low-priced organic products also generate distrust (Yin et al., 2016). Also, consumers' willingness to pay for organic food is lower, if they do not consider it credible (Krystallis and Chryssohoidis, 2005). This contrast underscores the importance of measuring these credibility factors to understand which aspects are most significant to consumers.

Hypothesis 3 (H3): Consumers consider lower priced organic products less credible than higher priced organic products.

Furthermore, the place of purchase plays a critical role in consumers' assessment of organic food credibility (Konuk, 2018). Positive consumer perceptions of retailers are particularly influential (Bonn et al., 2016), while in the case of online retailers, the media richness of the website can impact the perceived credibility of organic products (Yue et al., 2017). Consumers can be sceptical of organic origin, if a product is sold in a superstore (Padel and Foster, 2005).

Hypothesis 4 (H4): Organic products' perceived credibility will be lower if it is sold in a conventional supermarket.

The novelty of this study lies in its comprehensive examination of various external credibility factors and their impact on consumers' perceived credibility. Previous research has highlighted the importance of trust in the organic food industry and identified several factors that contribute to consumer scepticism. However, this study delves deeper into the specific product attributes that influence credibility, such as certification, country of origin, product communication, appearance, price, place of purchase, and packaging. By exploring these factors and their relative importance, this research provides valuable insights into consumer perceptions of organic food credibility and offers guidance for organic food producers in enhancing consumer trust. Furthermore, the comparative analysis between Hungary and Poland sheds light on potential similarities and differences in the evaluation of organic food products within different cultural and market contexts.

Research question 1 (RQ1): Which factor is the most important to influence consumers' credibility of organic food?

Research question 2 (RQ2): Are there differences between Hungarian and Polish consumers' evaluation of organic food credibility?

Methods

To assess the various external credibility factors of organic food, an online questionnaire was developed using the choice-based conjoint method. This method involves conducting a consumer survey in which respondents are asked to rank "cards" containing different combinations of products based on their perceived importance. Through this analysis, the relative utility and importance of each attribute level can be determined in relation to the others (Green et al., 2001).

Survey design. The initial step in constructing the survey involved selecting the measured factors and their respective levels, based on Nagy et al.'s (2022) systematic review and bibliometric analysis and the set-up hypothesis in chapter 2. Figure 1 shows chosen attributes and their levels used in the research. Rice was selected as the focal product for this research, as the aforementioned factors are relevant to organic rice and it is a widely consumed cereal globally, ensuring familiarity among consumers.

The attribute levels were determined based on market observations. In the case of packaging, in addition to commonly used plastic and paper packaging, a packaging-free option was included to account for the growing trend of packaging-free retailing (Fuentes et al., 2019).

While white rice is the most commonly available type in retailers, brown rice has gained popularity as a more natural choice (Saleh et al., 2019). Therefore, in the questionnaire, the product presentation attribute was set to reflect this market observation. Furthermore, communication on organic status was based on the prevalent claim of "From controlled organic farming" found on many organic products.

The country-of-origin attribute consisted of three levels, representing the main rice exporters to the European Union (EC, 2022). In addition to the local product, rice from India and the United States were included in the choice experiment. To aid in distinguishing the origin, the organic logo of the respective country was partially incorporated.

To establish the price levels, market observations conducted in April 2021 were considered. The low price level was set at 999 HUF/12 PLN (approximately €2.50), the average price at 1399 HUF/17 PLN (approximately €3.5), and the high price at 2499 HUF/29 PLN (approximately €6) per kilogram.

Currently, organic food is readily available in most supermarkets and has become the primary sales channel for such products (Willer et al., 2022). Alongside supermarkets, online sales channels are increasing in number, while traditional channels like markets still hold significance for consumers when purchasing organic food (Hamzaoui-Essoussi et al., 2013).

Conjoint analysis. In the second step of the study, conjoint "cards" were generated using the R program, following the guidelines outlined by Aizaki and Nishimura (2008). Using the selected attributes and their respective levels, a full factorial design was created using the R package AlgDesign. Given the large number of attributes and levels involved in the survey, it was impractical to present all possible product variations to the participants. To address this, an orthogonal design was employed to reduce the number of choice sets to 16 pairs of cards in the questionnaire (for example, see Fig. 2).

A notable aspect of this research is the approach taken when querying the participants. Instead of asking about their willingness to purchase the products, they were specifically asked to indicate which product they trusted to be genuinely organic. This methodology allows us to ascertain the significance of the product attributes that influence the credibility of organic food. However, one limitation of this approach is that it does not enable us to determine willingness to pay, despite price being included as one of the attributes in the conjoint analysis.

According to random utility theory, perceived utility can be split into two components: systematic utility and a random component:

$$U_i = V_i + e_i$$

where U is the utility of the product, V is the observable component and e is the random factor.

$$V_i = \beta_{\text{Pac}}\text{PAC}_i + \beta_{\text{App}}\text{APP}_i + \beta_{\text{Com}}\text{COM}_i + \beta_{\text{Coo}}\text{COO}_i + \beta_{\text{Pri}}\text{PRI}_i + \beta_{\text{Pop}}\text{POP}_i$$

V_i is the representative utility in the case of product i in the above showed equation. PAC_i, APP_i, COM_i, COO_i, PRI_i and POP_i values represent the product attributes of product i (packaging, appearance, communication, country of origin, price, and place of purchase), β value is an unknown coefficient, which represents the unobservable factors.
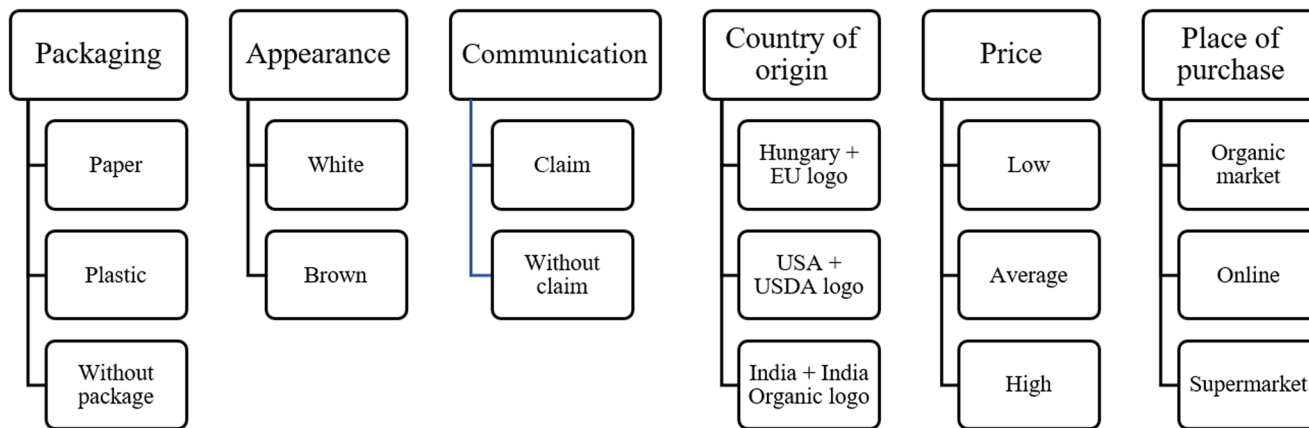
Fig. 1 Attributes and their levels used in the research. Packaging, appearance, communication, country of origin, price and place of purchase was taken into consideration with 2 or 3 attribute levels in the research.

Fig. 2 Conjoint cards. Example of conjoint choice set displayed to respondents with the question: 'From the two products above, choose the number you trust more to be truly organic!'.

Based on the above mentioned equation, conditional logit model was calculated in R, using clogit() function in the "survival" package (Lumley, 2006). To account for how individual characteristics impact the assessment of attributes, the model incorporates interactions between individual characteristics and attribute variables.

Within the questionnaire, in addition to selecting conjoint cards, Hungarian and Polish participants were also asked various questions relating to their organic food consumption habits. These included inquiries about the frequency of organic food consumption (Zander et al., 2015) and the participants' familiarity with the organic logos presented in the questionnaire (Janssen and Hamm, 2012).

In addition to collecting demographic data, different scales were employed to measure participants' attitudes towards specific food consumption habits. A 5-question scale developed by Brunsø et al. (2021) was utilized to gauge attitudes towards responsible food consumption. Respondents' general willingness to pay for organic food was assessed using questions adapted from Wang et al. (2020). Given that the attribute of country of origin was investigated, participants' ethnocentrism was also measured using a scale developed by Klein et al. (2006).

Data collection and sample. The online questionnaire was distributed to Hungarian respondents between 14 October and 7 December 2021 via social media platforms. For the Polish sample, the questionnaire was administered through the online platform Prolific from 20 to 22 June 2022. During these periods, a total of 723 Hungarian responses were collected, with 652 of them deemed analysable after excluding respondents who solely selected the option "I trust neither." For the Polish sample, a total of 299 responses were obtained, and after analysis, 290 responses were included in the study. All participants were asked if they are responsible for food purchase in their household, thus respondents who are not directly engaged in food purchasing decisions were excluded from analysis.

Table 1 Socio-demographic characteristics of the samples.				
	Hungary **(n = 652)**		**Poland** **(n = 290)**	
Gender				
Male	174	27%	211	73%
Female	478	73%	79	27%
Age				
18–25	249	38%	213	73%
26–35	160	25%	49	17%
36–45	93	14%	20	7%
46–55	84	12%	5	2%
56+	66	10%	3	1%
Education				
Primary school	3	0%	1	1%
Vocational school	8	1%	7	2%
Secondary school	241	37%	177	61%
University	400	62%	105	36%
Place of living				
Capital city	207	32%	24	8%
Town	292	45%	207	71%
Village	153	23%	59	21%
Perceived income				
Low	100	15%	30	10%
Average	344	53%	136	47%
High	208	32%	124	43%

There are notable differences between the two samples from Hungary and Poland. Table 1 illustrates that neither sample is representative of the overall population. The Hungarian sample is skewed towards female respondents, while the Polish sample is skewed towards male respondents. Additionally, the Polish sample over-represents younger participants. In terms of education, the Hungarian sample over-represents individuals with higher education, whereas the Polish sample is primarily composed of respondents with a secondary school education. However, similarities in terms of place of residence and income are observed between the Hungarian and Polish samples. Given the comparative nature of the research, data from 652 Hungarian respondents and 290 Polish respondents were separately analysed using the same methods.

Results

Descriptive statistics. Table 2 displays the food related consumer behaviour and attitude scales of the Hungarian and Polish samples. It can be observed that the pattern of the organic food buying frequency is very similar between the two samples. Approximately third of the respondents purchase organic food once or twice a month, Polish respondents slightly purchase more frequently organic food compared to the Hungarian participants. 14% of either Hungarian and Polish respondents almost never buy organic food, and approximately 10% of respondents can be considered as frequent organic food buyers.

Regarding organic logo knowledge, Hungarian respondents have a deeper awareness of either EU, USDA and India Organic logos compared to Polish respondents, although the same pattern can be observed: EU logo is the most well-known logo, and India Organic logo is the least known logo among the organic logos used in this research. Hungarian respondents scored higher points on both Food Responsibility, Price Sensitivity and Ethnocentrism scales as well.

Hungarian sample. Table 3 illustrates the findings regarding the influential factors among Hungarian respondents, with the country of origin emerging as the most significant factor, as

supported by the corresponding organic logo displayed on the conjoint cards.

Domestic origin positively impacted the credibility of organic food (Exp coef = 1.975), and for rice, Indian origin was deemed more credible than rice from the United States (Exp coef = 0.859).

The type of packaging emerged as the second most important factor in determining consumers' perceived credibility in organic rice. Paper packaging (Exp coef = 1.673) instilled confidence in respondents, while plastic packaging (Exp coef = 0.686) deterred them from trusting the organic authenticity of the food products. Packaging-free options were considered less credible compared to paper packaging.

Another less researched attribute that gained prominence was product appearance, which significantly influenced respondents' perceived credibility in organic rice. Specifically, when the product appeared brown, respondents were more inclined to believe that it was genuinely produced in accordance with organic standards (Exp coef = 1.266).

Other characteristics also exerted a significant, albeit lesser, influence on the credibility of organic rice. The claim "from controlled organic farming" bolstered confidence in the organic nature of the rice (Exp coef = 1.181). The place of purchase was indicated by the background of the products in the questionnaire, with the organic market background appearing more credible from the respondents' perspective (Exp coef = 1.161). Organic rice presented in an online store (Exp coef = 0.767) was considered less credible compared to rice with a supermarket background. Price had the least impact on the credibility of organic food, although it still carried significance. When the price of organic rice was lower than the average price, consumers harboured doubts about its organic origin. Conversely, a higher price enhanced the perceived reliability of the organic product (Exp coef = 1.113).

Polish sample. Table 4 displays that packaging, appearance and place of purchase were the most influential attribute for Polish respondents to consider a product as credible to be organic.

Packaging emerged as the most crucial factor for Polish respondents when evaluating the credibility of organic rice. Respondents from Poland considered paper packaging (Exp coef = 1.810) credible against plastic packaging (Exp coef = 0.355), similar to the Hungarian sample.

The appearance of the product also played a significant role. Polish respondents in line with Hungarian respondents perceived brown rice (Exp coef = 1.341) as more credible compared to white rice.

Place of purchase, while still significant, exerted a relatively lesser influence as the third most important attribute impacting the credibility of organic food for Polish respondents. Polish participants exhibited greater credibility in the organic market setting (Exp coef = 1.290), with online shopping (Exp coef = 0.705) appearing less credible than purchasing from a supermarket.

The country of origin demonstrated a significant but comparatively weaker impact on product credibility for Polish respondents. However, the order of attribute levels remained consistent between the two countries. In other words, rice of Hungarian origin was perceived as the most credible (Exp coef = 1.239), followed by rice from India and then the United States.

Price played a lesser role as an influencing factor for Polish respondents. Only the low price attained significance in influencing the credibility of organic rice (Exp coef = 0.726). However a low price had a negative effect on credibility just like

Table 2 Food-related consumer behaviours and attitudes of the samples.

	Hungary (n = 652)		Poland (n = 290)	
Organic food buying frequency (Zander et al., 2015)				
	n	%	n	%
Never/almost never	94	14%	39	14%
Less than once per month	138	21%	56	19%
About once or twice per month	252	39%	107	37%
About once per week	100	15%	62	21%
Several times per week	68	11%	26	9%
Logo knowledge (Janssen and Hamm, 2012)[a]				
	Average	SD	Average	SD
EU organic logo	4.046	2.288	3.794	2.071
USDA organic logo	2.623	1.990	2.021	1.448
India Organic logo	1.943	1.643	1.598	1.030
Food responsibility (Brunsø et al., 2021)[b]				
	Average	SD	Average	SD
I try to choose food produced with minimal impact on the environment.	4.879	1.782	4.076	1.611
I am concerned about the conditions under which the food I buy is produced.	4.954	1.785	4.275	1.615
It is important to understand the environmental impact of our eating habits.	5.195	1.775	4.237	1.705
I try to choose food that is produced in a sustainable way.	5.699	1.644	5.179	1.422
I try to buy organically produced foods if possible.	4.006	1.955	3.828	1.759
Price sensitivity (Wang et al., 2020)[b]				
	Average	SD	Average	SD
It is acceptable to pay more for organic food than conventional food.	4.560	1.903	4.344	1.555
I am willing to spend extra money in order to buy organic food.	4.376	1.891	4.052	1.669
Ethnocentrism (Klein et al., 2006)[b]				
	Average	SD	Average	SD
Only those products that are unavailable in Hungary/Poland should be imported.	5.414	1.885	4.251	1.896
Hungarian/Polish products, first, last, and foremost.	5.376	1.742	4.337	1.737
A real Hungarian/Polish person should always buy Hungarian/Polish-made products.	3.739	2.129	3.048	1.900
Hungarian/Polish people should not buy foreign products, because this hurts Hungarian/Polish business and causes unemployment.	3.819	2.028	2.550	1.606
It may cost me in the long run but I prefer to support Hungarian/Polish products.	4.943	1.835	3.601	1.677
	2.563	1.874	2.210	1.443
Hungarian/Polish consumers who purchase products made in other countries are responsible for putting their fellow Hungarian/Polish people out of work.				

[a]7-point Likert scale: 1 = This logo is completely unknown to me, 7 = This logo is well known to me.
[b]7-point Likert scale: 1 = I completely disagree with this statement, 7 = I completely agree with this statement.

Table 3 Results of the conditional logit model of the Hungarian respondents.

Level of attribute	Coefficients	Exp (coef)	se (coef)	z-value
Packaging				
Plastic[a]	−0.377	0.686*	0.043	−8.735
Paper[a]	0.515	1.673*	0.039	13.058
Appearance				
Brown[b]	0.236	1.266*	0.032	7.339
Communication				
Claim[c]	0.167	1.181*	0.032	5.151
Country of origin + organic logo				
Hungary + EU logo[d]	0.681	1.975*	0.036	18.712
USA + USDA logo[d]	−0.152	0.859*	0.043	−3.513
Price				
Low[e]	−0.229	0.795*	0.041	−5.599
High[e]	0.107	1.113*	0.042	2.549
Place of purchase				
Organic market[f]	0.149	1.161*	0.036	4.179
Online[f]	−0.265	0.767*	0.043	−6.171

*p < 0.001.
[a]Reference category: without packaging.
[b]Reference category: white.
[c]Reference category: without claim.
[d]Reference category: India + India organic logo.
[e]Reference category: average.
[f]Reference category: supermarket.

in the case of Hungarian sample. Unlike the Hungarian respondents, high price did not yield a positive effect for Polish participants.

The communication on the product had no significant effect on Polish respondents. It was the least important attribute in the Hungarian sample but seemed to be completely indifferent to the Polish sample.

Effect of individual characteristics on credibility factors. In addition to examining the overall importance of each product attribute, we further investigated potential differences in credibility among different consumer groups. Specifically, we assessed variations based on gender, age, level of education, place of residency, perceived income, and frequency of organic food purchases. Additionally, we explored the impact of logo knowledge, consumers' food responsibility, willingness to pay, and ethnocentrism. The statistically significant findings are summarized in Tables 5 and 6.

Among Hungarian male respondents, we observed a positive effect of paper packaging on credibility, albeit to a lesser extent compared to the average sample. Conversely, no significant difference was observed for Polish men.

Young Hungarian respondents appeared to be less influenced by high prices or the country of origin when determining credibility, but they exhibited higher perceived credibility in organic rice when the price was higher. Polish young respondents,

on the other hand, demonstrated a greater influence of product appearance compared to the average sample.

Respondents with higher education assigned greater importance to the attributes that were also deemed significant by the average sample. Specifically, Hungarian respondents with higher education displayed a higher coefficient for country of origin, while Polish respondents with higher education exhibited a similar difference for packaging. Additionally, for Polish respondents with higher education, appearance and country of origin held greater importance compared to the average sample.

Regarding place of residence, no notable differences were observed in the importance of credibility factors. However, Polish respondents with high income displayed a more significant distinction.

Individuals with higher education, similar to those discussed earlier, placed greater importance on paper packaging and Hungarian origin when assessing the credibility of organic rice.

A distinction arises between Hungarian and Polish respondents based on the frequency of organic food purchases. Polish

consumers who purchase organic food more frequently than the average demonstrated higher credibility in brown rice compared to white rice. In contrast, Hungarian regular organic food buyers placed greater perceived credibility in domestically sourced products and viewed the organic market as a reliable place of purchase.

Familiarity with logos also influenced consumers' perceptions of product credibility. Hungarian and Polish consumers who were more familiar with the EU organic logo were more inclined to consider products bearing this logo as credible. For Polish respondents, knowledge of the EU organic logo was also positively associated with credibility in paper-packaged brown rice.

Among Polish respondents who were more familiar with the USDA logo, products featuring this logo were considered more credible than those with the Indian organic logo. These respondents also viewed brown rice as more credible. However, they exhibited less credibility in the organic market as a place of purchase compared to other respondents.

Conversely, Polish respondents who were more familiar with the Indian organic logo expressed greater perceived credibility in the organic market as a place of purchase and exhibited less credibility in products originating from the USA and Europe. Hungarian respondents who were more familiar with the Indian logo also displayed lower credibility in the EU organic logo, with product appearance assuming greater importance for them.

Polish respondents with a higher willingness to pay demonstrated distinct behaviour when evaluating the importance of specific credibility factors. They perceived brown rice in paper packaging as a more reliable product, and a higher price instilled greater confidence.

As expected, Hungarian respondents with higher levels of ethnocentrism exhibited greater credibility in Hungarian-origin organic rice compared to respondents with lower levels of ethnocentrism. In the Polish sample, however, we observed the opposite pattern. Rice bearing the EU organic logo but originating from Hungary garnered significantly less credibility among ethnocentric Polish respondents. Furthermore, the appearance of the product did not factor into their assessment of the credibility of organic rice. Nonetheless, these consumers displayed a stronger preference for paper-packaged products available at the organic market, considering them more credible from an organic standpoint. While the organic market background inspired confidence among Polish ethnocentric respondents, online sales evoked explicit distrust regarding the organic status of the product.

Table 4 Results of the conditional logit model of the Polish respondents.

Level of attribute	Coefficients	Exp (coef)	se (coef)	z-value
Packaging				
Plastic[a]	−1.035	0.355*	0.071	−14.554
Paper[a]	0.593	1.810*	0.064	9.266
Appearance				
Brown[b]	0.294	1.341*	0.051	5.748
Communication				
Claim[c]	−0.028	0.972	0.052	−0.546
Country of origin + organic logo				
Hungary + EU logo[d]	0.214	1.239*	0.056	3.845
USA + USDA logo[d]	−0.254	0.775*	0.066	−3.871
Price				
Low[e]	−0.320	0.726*	0.066	−4.829
High[e]	0.036	1.036	0.072	0.499
Place of purchase				
Organic market[f]	0.255	1.290*	0.058	4.372
Online[f]	−0.350	0.705*	0.070	−4.988

*p < 0.001.
[a]Reference category: without packaging.
[b]Reference category: white.
[c]Reference category: without claim.
[d]Reference category: India + India organic logo.
[e]Reference category: average.
[f]Reference category: supermarket.

Table 5 Results of the conditional logit model: interaction effects of Hungarian respondents.

Level of attribute	Interaction effect	Coefficients	Exp (coef)	se (coef)	z-value
Packaging					
Paper	Gender	0.328	1.389*	0.076	4.307
Appearance					
Brown	Age	0.177	1.194*	0.052	3.412
Brown	India logo knowledge	0.324	1.382*	0.066	4.935
Country of origin + organic logo					
Hungary + EU logo	Age	0.473	1.605*	0.058	8.193
Hungary + EU logo	Education	0.793	2.209*	0.047	16.755
Hungary + EU logo	Organic buying frequency	0.883	2.419*	0.073	12.078
Hungary + EU logo	EU logo knowledge	0.834	2.304*	0.054	15.575
Hungary + EU logo	India logo knowledge	0.322	1.379*	0.073	4.381
Hungary + EU logo	Ethnocentrism	0.892	2.441*	0.062	14.302
Place of purchase					
Organic market	Organic buying frequency	0.254	1.289*	0.070	3.604

*p < 0.001.

Table 6 Results of the conditional logit model: interaction effects of Polish respondents.

Level of attribute	Interaction effect	Coefficients	Exp (coef)	se (coef)	z-value
Packaging					
Paper	Education	0.800	2.226*	0.108	7.436
Paper	Income	0.733	2.081*	0.101	7.253
Paper	EU logo knowledge	0.501	1.651*	0.103	4.858
Paper	USDA logo knowledge	0.425	1.530*	0.160	2.663
Paper	Higher WTP	0.808	2.244*	0.144	5.604
Paper	Ethnocentrism	0.651	1.918*	0.229	2.841
Appearance					
Brown	Age	0.349	1.418*	0.060	5.804
Brown	Education	0.371	1.449*	0.091	4.057
Brown	Organic buying frequency	0.398	1.489*	0.098	4.048
Brown	EU logo knowledge	0.349	1.417*	0.082	4.429
Brown	Higher WTP	0.422	1.525*	0.122	3.458
Country of origin + organic logo					
Hungary + EU logo	Education	0.335	1.397*	0.097	3.446
Hungary + EU logo	Income	0.363	1.438*	0.086	4.194
Hungary + EU logo	EU logo knowledge	0.366	1.442*	0.089	4.093
Hungary + EU logo	USDA logo knowledge	0.487	1.628*	0.145	3.368
USA + USDA logo	India logo knowledge	−0.711	0.491*	0.184	−3.860
Place of purchase					
Organic market	India logo knowledge	0.388	1.474*	0.157	2.468

*$p < 0.001$.

Discussion

The findings of this study corroborate previous research while also uncovering new relationships between factors influencing credibility in organic food. Overall, all the examined factors demonstrated an influence on consumers' credibility in organic rice, although the differences between attribute levels were not consistently large, and not all results achieved statistical significance.

The significance of country of origin has been established in previous studies (e.g. Yip and Janssen, 2015; Lee et al., 2020; Thorsøe et al., 2016; Padel and Foster, 2005). However, in our research, this attribute was presented alongside logos. Our findings support prior research, such as Pedersen et al.'s (2018) assertion that the image and credibility of the exporting country can influence credibility in imported organic food. It is worth noting that knowledge of logos had a positive impact on credibility in products bearing those logos, similarly to the findings of Zander et al. (2015), highlighting the importance of education in improving consumers' perceived credibility in organic food. We observed some differences in the perceived credibility among Hungarian and Polish consumers concerning the country-of-origin attribute, namely Hungarian consumers were more in favour of the Hungarian rice, on the other hand Polish participants considered it less trustworthy, though still more credible than imported organic rice. For both groups, products displayed with the EU organic logo were indicated as "Produced in Hungary" since rice production does not exist in Poland. Consequently, for Polish respondents, the product was not considered domestic. Overall, these findings can confirm Hypothesis 1.

Historically, there has been limited research on the packaging of organic food (Hemmerling et al., 2015). However, for both Hungarian and Polish respondents, the type of packaging emerged as a notably significant aspect, which corresponds with the findings of Danner and Menapace (2020), that packaging plays a crucial role for the products' credibility for European consumers. We investigated packaging-free products, which are gaining popularity among environmentally conscious consumers (Rapp et al., 2017), and they appeared to be a preferable option compared to plastic packaging, although paper packaging garnered even greater credibility. One possible explanation is that the natural brown colour of the paper packaging in the questionnaire conveyed a sense of naturalness, aligning with consumers' perception of organic products. This explanation is verified with the research of Marozzo et al. (2020), who tested natural colours' consumer perceptions. According to their findings, 'au naturel' colours of packaging can increase willingness to pay and perceived authenticity in the case of healthy products. Additionally, paper packaging is considered a more sustainable choice, which holds considerable importance for organic food consumers (De Canio and Martinelli, 2021). While our current research did not directly address this aspect, the results suggest that product colour may also impact the credibility of organic products, as evidenced by Šola et al.'s (2022) finding that the colour of organic food packaging influences consumers' decision-making processes.

The appearance of organic products has likewise received limited research attention, but our study demonstrates that product type does affect credibility, namely brown rice appears to be more credible to respondents compared to white rice, supporting Hypothesis 2. Consumption of brown rice is much lower compared to white rice, and consumers' sensory preferences are biased towards white rice (Gondal et al., 2021). On the other hand, brown rice can be considered as a healthier option compared to white rice (Saleh et al., 2019). This "less tasty=healthy" intuition of consumers (Raghunathan et al., 2006) perfectly resonates with brown rice, thus the natural appearance of brown rice lends it an organic and authentic look, potentially enhancing its perceived credibility.

Price plays a paradoxical role in the perceived credibility of organic food products. Organic rice cost more to produce (Suwanmaneepong et al., 2020), making it a more expensive option for consumers, although consumers are price sensitive, especially in Hungary and in Poland (Ferencz et al., 2017). As Hughner et al. (2007) highlighted, consumers are looking for low prices, although low price can hinder the credibility of the product. Our results support this finding and Hypothesis 3, namely that low price creates scepticism among consumers, although high price was not a strong aid to build credibility of organic product.

The purchase environment of the organic product was influential both for Hungarian and Polish participants, which corresponds to previous studies, that consumers' perception of the retailers has an impact on the organic products' credibility which it sells (Bonn et al., 2016; Hwang and Chung, 2019; Konuk, 2018). The importance of online retail is rapidly growing in Central-Eastern Europe (Bartók et al., 2021), although our results show that consumers still do not consider products purchased online credible compared to traditional retail channels. As organic food become more mainstream, most of the purchase happens in supermarkets (Szente, 2004, Willer et al., 2022), but this does not reflect the level of credibility. Consumers considered organic farmers' market as the most credible source of organic food in our research, especially among ethnocentric and regular organic food buyers. One explanation of this phenomena can be found in the research of Hamzaoui-Essoussi et al. (2013), that the size of farm influences the credibility of organic food produced by them. In organic farmers' market usually only small farmers can sell their product, on the other hand, supermarkets mostly sell so called "industrial organic" products, which were produced by much larger farms, which are considered less trustworthy.

Regarding Research question 1, the results indicate that for organic products to build credibility, they should originate from the consumer's own country, be packaged in natural-looking paper packaging, and be sold at a higher price. The order of importance may slightly differ for Polish consumers, but the aforementioned findings hold true for both groups.

Despite differences in demographic characteristics between the Hungarian and Polish samples, the results exhibited remarkable similarity, likely due to shared cultural and social backgrounds, providing answer to Research question 2. While there are variations in the food markets of the two countries, there are many similarities in consumer habits (Potori et al., 2014).

Limitations

It is important to note that certain demographic characteristics and consumption attitudes influenced the extent to which product attributes influenced credibility of organic food, although those demographic characteristics were not homogenous between the two samples, making it difficult to generalize results. Furthermore, when evaluating the conjoint cards, respondents made choices based on attribute combinations, with some attributes potentially impacting each other, while others may not be applicable to certain food types. Also, due to the nature of this research, only limited sets of attributes could be evaluated, thus other attributes might play a role influencing credibility. Regarding the country-of-origin attribute, the organic logo of the respective country was displayed on the packaging. Consumer familiarity with the logo varied, and more recognizable logos were deemed more credible. Due to the limitations of online data collection, there were limited opportunities to display different options for the place of purchase attribute. However, an explanation of the background's meaning was provided at the beginning of the questionnaire.

While the study offers valuable insights into the perception of organic product credibility, its applicability to producers and marketers may be constrained because it did not directly investigate consumer buying behaviour, including the evaluation of a possible price premium for organic products. Regardless of the limitations, this study also paves the way for future studies. As the study solely focused on one type of staple product, it would be worthwhile to explore other food products where additional factors may contribute to strengthen credibility. Additionally, conducting research in a real-life setting, rather than presenting respondents with theoretical product combinations virtually, could yield different results. Although the theoretical products were designed to reflect real market situations, offline research may expose respondents to different stimuli.

Conclusion

In conclusion, this study contributes to our understanding of the factors influencing consumers' perceived credibility of organic food. From a theoretical perspective, these findings prompt the exploration of broader frameworks for understanding consumer decision-making in the context of organic products. Researchers in consumer psychology and marketing can build upon these insights to refine existing models and develop new ones that better capture the nuances of credibility assessment.

The findings confirm previous research while offering new insights into the role of packaging, product appearance, and country of origin. The results highlight the importance of natural-looking paper packaging and the positive impact of the appearance of brown rice on credibility. Moreover, the study emphasizes the significance of consumer knowledge of organic logos and the influence of place of origin on credibility. The similarities in results between Hungarian and Polish respondents, despite demographic differences, suggest shared consumer habits and cultural backgrounds. This study highlights the potential transferability of credibility factors across diverse cultural contexts, as evidenced by the similar responses of Hungarian and Polish participants. This observation opens possibilities for cross-cultural studies and encourages researchers to investigate how cultural factors interact with credibility perceptions in different regions.

However, further research is warranted to explore different food products and conduct studies in real-life settings. Overall, this research provides valuable information for organic food producers and marketers seeking to enhance consumers' perceived credibility of their products. By addressing the credibility factors identified in this study, producers can improve their communication strategies and ultimately strengthen consumer trust in organic food.

Data availability

All data generated or analysed during this study are included in this published article and its Supplementary Information files.

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Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by LBN, BU-P and ÁT. The first draft of the manuscript was written by LBN and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare no competing interests.

Ethical approval

The study was approved by the Interim Ethical Committee of the Hungarian University of Agriculture and Life Sciences, Doctoral School of Economic and Regional Sciences (protocol code 103/2022, 7 April 2022).

Informed consent

Informed consent was obtained from all participants prior to data collection. All participants accepted and voluntarily participated in the study after the researcher assured them of anonymity and that their responses were solely for academic purposes.

Additional information

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