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CONSUMER RESEARCH OF CREDIBILITY AND VALUE OF ORGANIC FOODS

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1. BACKGROUND OF THE WORK, OBJECTIVES

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. Organic food is considered as a credence good, because there is an information asymmetry between the consumers and producers (Giannakas, 2002). In the case of credence quality, the consumer of a product can not fully evaluate the quality of a particular good (Darby & Karni, 1973). Consequently, many consumers, particularly in emerging markets (Nuttavuthisit & Thøgersen, 2017), remain sceptical about the authenticity of organic products.

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 literature review findings, where the following attributes were found to be the most influential: packaging (Danner & Menapace, 2020), appearance (Nuttavuthisit & 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 & Hamm, 2012). Organic logo generally signals certification to consumers, and well-known logos can create trust (Janssen & Hamm, 2012).

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 (Watanabe et al., 2020; Bruschi et al., 2015; Yadav et al., 2019; Lang & 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 & 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 & 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 & Foster, 2005).

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

Assessing the actual sustainability of packaging is a complex task for consumers (Herrmann et al. 2022). In addition to the challenge of assessment, consumers often lack knowledge about the environmental friendliness of packaging materials (Lindh et al. 2016). Providing additional information to consumers can assist in their decision-making process. For instance, research by Van Asselt et al. (2022) revealed that negative information about plastic packaging decreased consumers' willingness to pay for a product. According to Wensing et al. (2020), green nudges can increase WTP, but nudges are only effective if they match consumers' cognitive style. In some cases, consumers rely on the appearance of packaging rather than communicated information, posing a risk of misleading practices in the food industry (Ketelsen et al. 2020). However, despite the growing interest in environmentally friendly packaging, Ketelsen et al. (2020) found no field studies on consumers' attitudes toward sustainable packaging in their review.

Hypothesis 5 (H5): Environmentally friendly packaging increases the willingness to pay for organic products.

Green and earthy tones are often associated with the organic nature and environmental friendliness of a product (Chrysochou & Festila, 2019). These colors communicate a commitment to sustainability and resonate with consumers who prioritize eco-friendly choices. Hallez et al. (2023) add nuance to this understanding, suggesting that cooler colors, such as blue and green, can influence perceptions of healthiness and sustainability. However, these colors seem to have a limited impact on taste perception.

Hypothesis 6 (H6): In the case of organic products, green packaging increases willingness to pay and trust in the product.

2. MATERIALS AND METHODS

In the initial phase of the research, I conducted a literature review and published a systematic review article based on its results (Nagy et al. 2022). Following the PRISMA guidelines, I identified 429 articles during my search, of which I selected 55 studies for further analysis. Bibliometric analysis using VOSViewer and CitNetExplorer software was conducted to assess the connections between the selected articles.

Based on the preliminary literature review, the importance of product attributes influencing credibility can be analyzed using conjoint analysis, a method relying on consumer surveys. Participants are asked to rank "cards" with different product combinations according to their importance. This allows determining the importance of individual attributes from the consumers' perspective and the utility of different levels of these attributes relative to each other.

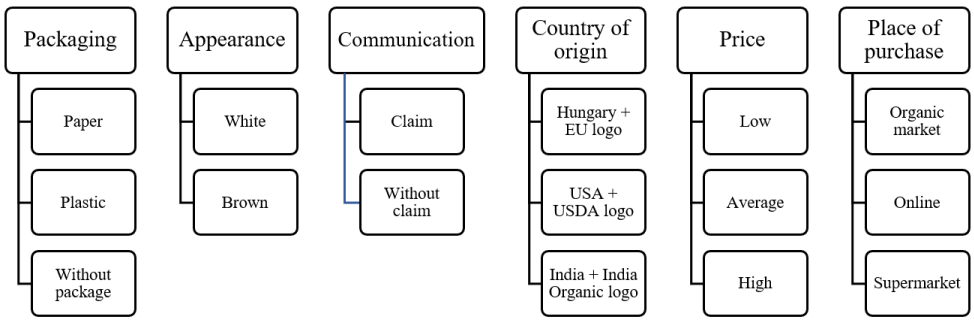

Figure 1. Attributes and their levels

For measuring the various external factors influencing the credibility of organic foods, we developed an online questionnaire based on the conjoint method, which was administered in Hungary and Poland. The Hungarian questionnaire was shared on social media platforms between October 14 and December 7, 2021, collecting 723 participants during this period, with 652 responses deemed analyzable. The Polish questionnaire was administered through the Prolific online platform on June 20-22, 2022, reaching 299 Polish respondents, with 290 responses available for analysis.

To investigate the willingness to pay for products with different credibility-influencing attributes, we employed experimental auction methods. Previous studies have confirmed that this method can mitigate biases in willingness-to-pay responses obtained through theoretical questioning.

In the research, we examined the consumer reception of the Product Environmental Footprint (PEF) labeling, which will be introduced in the European Union, and its impact on the credibility of organic foods. This is crucial for practical usability, as no such research has been conducted yet, and it provides valuable insights for food producers. Sustainability strongly influences the credibility of organic foods, making it important for producers to know whether it is worthwhile to include such logos on their products. Data collection took place between February and March 2023 in Budapest, with 105 participants at the Csörsz Street organic market, using the Becher-DeGroot-Marschak (BDM) experimental auction method.

Colors play a significant role in the presentation, packaging, and branding of organic food products, influencing consumers' overall perception of quality, credibility, and sustainability. Examining the impact of colors on organic foods using the experimental auction method can provide valuable insights into the cognitive and economic factors influencing consumer decision-making processes. The survey was conducted on October 9-10, 2023, at MATE Budai Campus, with 102 participants. The Becher-DeGroot-Marschak (BDM) experimental auction method was employed in this phase of the research.

3. RESULTS AND DISCUSSIONS

3.1. Literature review and bibliometric analysis

In the systematic literature review, 9 factors were identified, which can influence the credibility of a food product: labeling, certification, place of purchase, country of origin, brand, price, communication, product category, and packaging. Results of the systematic review can be seen in Figure 2.

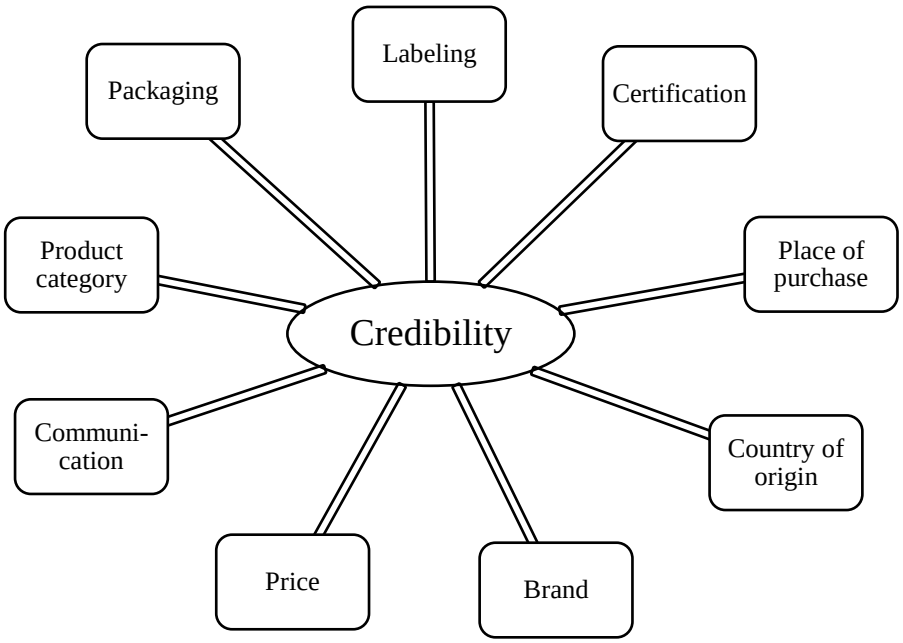

Figure 2. Factors influencing the credibility of organic foods

3.2. Conjoint analysis

Country of origin was 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).

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 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.

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.

3.3. Experimental auctions

Generally, products in plastic packaging without a Product Environmental Footprint (PEF) logo had the lowest WTP value in both the control and treatment groups. Products in plastic packaging with a PEF logo saw an average price premium of 18% across the entire sample. Meanwhile, biodegradable packaging without a PEF logo commanded a 24% price premium compared to pasta in plastic packaging. The combined effect of the PEF logo and biodegradable packaging amounted to a 41% increase in value compared to the benchmark

product. Importantly, the measured WTP values did not exhibit statistically significant differences between the control and treatment groups.

Participants who received information about the harmful nature of microplastics demonstrated higher price premiums for eco-friendlier products, particularly for Products B and D, which were packaged in biodegradable material. In the case of biodegradable packaging without a PEF logo, the treatment information had a statistically significant effect (t=-2.0391, Pr=0.0440) on the price premium, specifically a 31% increase compared to the control group's 17% price premium.

The presence of the PEF logo alone was unable to achieve a higher price premium compared to products with only biodegradable packaging, despite signaling higher sustainability expectations. A potential reason for the lack of a significant premium generated by the PEF might also be that respondents already perceive organic food to generally be more environmentally friendly. However, it is evident that when biodegradable packaging and the PEF logo were used together, a higher willingness to pay was achieved among respondents compared to when they were used separately. One possible explanation is that the PEF logo considers sustainability metrics that consumers cannot easily verify while shopping, making it a credibility attribute. This credibility is further supported by the environmental-friendliness of the packaging, which is easily recognizable by consumers, reinforcing trust in the PEF logo and leading to a higher willingness to pay when both biodegradable packaging and the PEF logo are used together.

Regarding packaging colors, participants exhibited varying WTP across different colors, with mean values of HUF 544.58 / € 1.36 (white), HUF 570.87 / € 1.44 (black), HUF 543.59 / € 1.35 (green), and HUF 538.71 / € 1.34 (blue). Standard deviations ranged from 185.76 to 194.41, reflecting the dispersion of WTP values. Notably, all color-labeled products had a potential maximum WTP of 1000.

Trust, premiumness, and healthiness significantly influenced WTP across all color-labeled pasta products, except for green color products, where healthiness was not influencing. Trust and premiumness had particularly strong positive effects, suggesting that these attributes played a pivotal role in participants' valuation of the products. Price consciousness positively influenced WTP for black-labeled pasta ($p=0.05$), while quality consciousness positively affected WTP for white-labeled pasta ($p=0.09$). General health interest positively affected WTP for green-labeled pasta ($p=0.06$), whereas interest in natural products does not influence WTP significantly. Food responsibility had a mixed impact on WTP, with a negative influence on black-labeled pasta and a positive influence on blue-labeled pasta.

4. CONCLUSIONS AND RECOMMENDATIONS

The interest in organic food is growing, however we can see a shift from developed to developing countries in terms of geographical focus of the articles. This shift and geographical difference in consumer attitudes could be detected by almost all identified factors of organic food credibility.

Certification is one of the most important factor to build consumer trust, as certification covers all those activities where compliance with organic requirements are assessed, so that should be a guarantee for consumers. Certifications from developed countries are much more trusted compared to certifications from developing countries.

Besides certification, labeling is crucial to inform consumers about the organic characteristics of a product, which transfers the credence attribute to a search attribute. The importance of labeling can be explained with the fact, that labels contain most of the information about the product, so consumers can assess the product from other perspectives (eg. nutritional values, origin, ingredients, etc), which might influence perceived trust.

Labeling is well researched factor, however there are some kind of loose products, where the lack of labeling is common practice, like fruit and vegetables or bakery products. In those cases, credibility might be questioned by consumers, so research on these products is desirable.

The results of the credibility aspects of the country of origin seem to correlate with the results on certification, and the findings are strongly related to the results of the bibliometric analysis. Organic products from developing countries can cause doubt in consumers both from developed and developing countries, which might indicate the general low institutional trust in these countries.

In the case of certification, labeling, and country of origin, the findings of existing research seem to provide enough evidence to draw a reliable conclusion. All of these factors play an important role in the perception of trust towards organic food.

The findings of the conjoint research confirm previous findings 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.

The field study contributes insights into the influence of information on WTP, with a specific emphasis on treatment effects related to the harmful effects of

microplastics. These findings carry significant policy implications, highlighting the imperative for targeted communication strategies to effectively convey the environmental consequences of product choices. As consumer awareness expands, policymakers can leverage these insights to formulate initiatives that not only promote sustainable practices but also harness the power of information to induce positive behavioral change in the marketplace.

The presence of environmentally friendly packaging and the PEF logo has a positive impact on both willingness to pay and consumer trust in the product's sustainability. Despite its holistic approach, the PEF logo does not increase the price premium as much as biodegradable packaging alone, but when used together, it seems to instill greater consumer trust that leads to a higher willingness to pay for a given product.

The information treatments about the harmful effects of microplastics were not effective for all consumer groups. However, for female, higher-income, and more environmentally conscious respondents, a significant increase in willingness to pay was observed. Therefore, it can be concluded that it may be worthwhile to share such information with these consumer groups. Unfortunately, for those who consider themselves less environmentally conscious, negative information treatment was less effective, making it difficult to reach the very group that should be encouraged to make more environmentally friendly purchasing decisions.

The colors used in the presentation, packaging, and branding of organic food products play a significant role in shaping consumer perceptions and preferences. The experimental auction method provides a valuable avenue for researchers to explore the complex interplay of cognitive and economic factors that influence consumers' willingness to pay for organic foods based on color-related perceptions. Businesses in this market must consider the implications of color choices in their branding and packaging strategies to align with consumer values and effectively communicate the qualities of their products.

Organic producers should carefully consider packaging color choices based on their target market and objectives. For emphasizing healthiness and sustainability, white and green are suitable, while black may appeal to those emphasizing premium quality. The nuances in consumer responses to colors highlight the need for a tailored approach, ensuring alignment with the values and preferences of diverse consumer segments in the dynamic organic food market.

5. NEW SCIENTIFIC ADDITION OF CURRENT RESEARCH

1) A systematic review was conducted to identify extrinsic factors which influence consumers' perceived trust in organic food. The following factors were identified as influencing the credibility of organic food: labeling, certification, place of purchase, country of origin, brand, price, communication, product category, packaging.
2) The assessment of various factors influencing credibility was employed with a choice-based conjoint method. 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.
3) 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 favor of the Hungarian rice, on the other hand Polish participants considered it less trustworthy, though still more credible than imported organic rice.
4) Our studies demonstrated that packaging plays a crucial role for the organic products' credibility. We investigated packaging-free products, which are gaining popularity among environmentally conscious consumers, and they appeared to be a preferable option compared to

plastic packaging, although paper packaging garnered even greater credibility.

5) The findings of the conjoint research confirms that product type does affect credibility of organic food, namely brown rice appears to be more credible to consumers compared to white rice, as the natural appearance of brown rice lends it an organic and authentic look, potentially enhancing its perceived credibility.
6) With BDM method I found that consumers are willing to pay more for products with both biodegradable packaging and Product Environmental Footprint (PEF) labels, indicating heightened trust and perceived sustainability. Information about microplastics' adverse environmental effects influenced consumer choices, particularly among females, higher-income individuals, and those with stronger environmental concerns.
7) We determined varied consumer responses, suggesting a more intricate relationship between color, trust, premiumness, and healthiness perceptions. Demographic factors such as age, gender, income, and residence areas influence WTP for organic foods with different color. Trust and perceived premiumness significantly influence WTP, highlighting their pivotal role in consumer valuation.

6. THE AUTHOR'S SCIENTIFIC PUBLICATIONS IN THE FIELD OF THE DISSERTATION

Publications in scientific journals:

- Nagy LB, Lakner Z, Temesi Á (2022) Is it really organic? Credibility factors of organic food–A systematic review and bibliometric analysis. PLoS ONE 17(4): e0266855. https://doi.org/10.1371/journal.pone.0266855
- Nagy, LB., Unger-Plasek, B., Lakner, Z., & Temesi, Á. (2023). Confidence in organic food: a cross-country choice based conjoint analysis of credibility factors. Humanities and Social Sciences Communications, 10(1), 1-11. https://doi.org/10.1057/s41599-023-02293-7
- Nagy, LB., Vecchio, R., Caso, G., Eren, B. A., Unger-Plasek, B., Lakner, Z., ... & Temesi, Á. (2024). Eliciting vulnerable consumers' preferences for redundant vs. organic and functional claims: Experimental auction studies among young and older adults. Journal of Agriculture and Food Research, 15, 100925. https://doi.org/10.1016/j.jafr.2023.100925

Scientific conferences:

- Which factors influence consumers when assessing the trustworthiness of an organic food? Evidence from a choice based conjoint study, International Food Marketing Research Symposium, San Antonio, Texas, USA, 14-16 June, 2022
- A bioélelmiszerek iránti fogyasztói bizalom: különböznek-e a magyar és a lengyel fogyasztók? / Trust in organic food: do Hungarian and Polish consumers differ? Lengyel-Magyar Agrár-élelmiszeripari Innovációs Fórum, Budapest, 25 January, 2023
- Willingness to pay for partly and fully sustainable organic products: field research with experimental auction method, International Food Marketing Research Symposium, Prague, Czech Republic, 13-15 June, 2023