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FOSTERING A LINK BETWEEN CREATIVITY AND CONSUMER ACCEPTANCE: ESSENTIAL FACTORS FOR ADVANCING INNOVATIONS IN FOOD INDUSTRY

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Abstract. This research aims to explore the acceptance of unconventional food products that convey creative solutions for sustainable food production and consumption. This paper presents the first stage results of an extensive Baltic Sea region's population survey organized to understand how innovative food products' creators could better enhance the link between sustainable products and different segments' customer acceptance. In scope of this study, the authors focused on youth market segments, who are known for their adventurous and experimental eating habits. The authors hypothesized that products that have been created to comply with socially responsible and sustainable food products' requirements face resistance from the youth who do not view them as superior to conventional ones. The cross-sectional study utilized mixed-method methodology, combining qualitative and quantitative approaches, including a literature review, in-depth focus group interviews, and comparative analysis using normal distribution assessment and sentiment classification. The research findings indicate that while the youth acknowledge the social and environmental benefits of innovative food products, they remain hesitant to adopt them personally. Therefore, it is vital for innovative food creators to understand the biases and behaviors of young consumers, ensuring transparency about product contents, motivating them to embrace new consumption models, try unconventional foods, and highlight the personal and societal advantages of purchasing these items.

Keywords: consumer behavior, creative solutions, food innovation, sustainability, sustainable consumption, young generation.

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1. Introduction

Sustainable food products, socially advisable food products, and innovative food products are interconnected concepts within the realm of food production, consumption, and environmental impact. This theoretical discussion aims to provide a concise overview of these terms and highlight their shared characteristics.

A sustainable food product refers to food that is produced, processed, and distributed in a manner that minimizes negative environmental impacts and promotes a long-term ecological balance. Sustainability encompasses various aspects, such as reducing the carbon footprint, conserving natural resources, protecting biodiversity, and ensuring social and economic equity throughout the food system. Sustainable food production often involves practices like organic farming, agro-ecology, regenerative agriculture, and responsible sourcing (Dioula et al., 2013; Pretty et al., 2011). In turn, a socially advisable food product pertains

to food choices that align with ethical and socially conscious considerations. It goes beyond individual health concerns and takes into account broader social, cultural, and ethical dimensions. Socially advisable food products are produced and sourced in a manner that respects human rights, fair trade principles, labor rights, animal welfare, and community well-being. Regarding innovative food products, scientific literature studies mainly suggest that these products represent creative solutions that introduce new elements or features to the existing food market. Innovative food product often involves advancements in food processing techniques, product formulations, packaging, or the integration of emerging technologies. Innovation in food products can include alternative protein sources, plant-based meat substitutes, functional foods, sustainable packaging solutions, and novel food ingredients. These products aim to meet evolving consumer demands, address sustainability challenges, and provide creative solutions to food-related issues (Hartmann & Siegrist, 2017; Verain et al., 2016).

Sustainable food products, socially advisable food products, and innovative food products share several common aspects. Firstly, they all aim to address the pressing challenges facing the food industry, such as environmental degradation, social inequalities, and health concerns. Often using creative solutions, they strive to promote responsible consumption and production patterns that align with ecological limits and societal well-being. Secondly, these products emphasize the need for a comprehensive approach to the food system, taking into account environmental, social, and economic dimensions. They recognize the interdependencies between human well-being, planetary health, and ethical considerations. Lastly, they all contribute to the broader goals of achieving a more sustainable, inclusive, and resilient food system that caters to the needs of present and future generations (Lang & Heasman, 2004; Khan et al., 2011).

Consequently, the authors conclude that sustainable food products, socially advisable food products, and innovative food products share a unified vision of transforming the food industry towards greater sustainability, social responsibility, and creativity. By embracing these concepts, we can work towards building a more sustainable and equitable food system for the well-being of both individuals and the planet.

Food innovation in a more encompassing sense includes its technological, social and management or organizational dimensions (Knickel et al., 2021). The European Union (EU) encourages creation of innovation in the food sector through different measures such as: research funding, supportive policies, and collaboration between industry stakeholders, research institutions, and policymakers. By fostering innovation creation, the EU aims to enhance a sustainable, resilient, and competitive food sector that meets the diverse needs of its citizens while addressing global challenges. Accordingly, innovative products can create a competitive advantage for food producing, processing and public catering companies, leading to increased revenue and growth. For all this to happen, consumers must be positive about innovation. There are several valuable research works dedicated to exploring how the link between food creativity and consumer acceptance could be fostered through various approaches and initiatives (Wang et al., 2021; Massari et al., 2023; Jones, 2022). Moreover, some previous studies suggest that in creating new product concepts and consumption habits, the significance of young consumers in elucidating prevailing food preferences within markets is

noteworthy (Knickel et al., 2021). The young generation refers to individuals typically ranging in age from teenagers to those in their early thirties. This demographic group encompasses millennials and Generation Z, born roughly from the late 1990s to the early 2000s, who are currently shaping cultural, social, and economic trends in Europe and around the world. Their propensity for embracing novel dietary selections and their potential influence on lasting predilections offer valuable insights into prospective market dynamics (Wach & Bilan, 2023). The behavioral proclivities of this demographic hold the potential to function as precursors for broader consumer trends, aiding in the anticipation of forthcoming product demand and guiding optimal marketing strategies. In addition, their role as trendsetters is evident, as they drive the adoption of health-conscious, environmentally sustainable, and convenience-oriented dietary options, thereby exerting a pivotal impact on the trajectory of the food industry. Consequently, a comprehensive understanding of youth preferences proves instrumental in product tailoring, adaptive responses to evolving tastes, and the maintenance of competitiveness within an ever-changing market milieu.

In authors' opinion, it is also worth examining the variances in food perception between Western and Eastern European countries within the EU, thus obtaining a valuable knowledge pertaining to cultural, consumer, policy, and sustainability dimensions. This understanding of customers enhances decision-making, facilitates the development of impactful marketing strategies, aids in policy formulation, and fosters a deepened appreciation for culinary diversity within the European landscape.

The Baltic Sea (BS) region consists of several countries that surround the BS, including Poland and Latvia, and the overall population that live in this region is approximately 85 million people (WWF, 2023). As of 2022, the population of Poland was approximately 41 million people and of Latvia – around 1.9 million people (United Nations: Department of Economic and Social Affairs, 2022). Accordingly, Poland is a significant country in the region, as its population accounts for about 48% of the total population. While the population of Latvia, being a smaller country, would account for a smaller proportion of the total population, perhaps around 3%. The authors are convinced that the close historical ties and good relations between the two countries are also reflected in eating habits. Latvia and Poland share similar food consumption habits, including a preference for traditional staple foods like potatoes, bread, dairy products, and meat. Moreover, both countries have a tradition of hearty and home-style cooking, using seasonal and locally sourced ingredients. They also celebrate festive foods during specific holidays. These similarities reflect cultural and historical connections with Eastern European cuisine.

The aim of the current study was to explore the acceptance of creative food products among the young generation in the BS region focusing on Polish and Latvian population. In scope of the study, the following tasks were set: 1) to conduct online focus group interviews in Poland and Latvia to comprehend the young population's attitudes towards innovative food products; 2) to perform a comparative analysis by using normal distribution assessment and sentiment classification to identify possible alternative strategies that could influence consumer sentiment in Poland and Latvia.

This article is based on the initial stage study conducted in scope of a larger research work covering four BS countries – Latvia, Poland, Lithuania and Estonia – and will include

such market segments as health-conscious consumers, foodies, and individuals with specific dietary preferences or restrictions, as they may have unique perspectives on innovative food products. Since there are currently not many studies conducted in Europe that deal with problems how to match creativity in food production with such consumers' acceptance, this article could supplement the research gap on consumers' attitude towards unusual food in the BS region.

2. Materials and methods

The research was based on a mixed-method methodology that combined qualitative and quantitative research methods in consistent methodological steps (Figure 1). In January – July, 2023, a group of researchers from Poland conducted an internet-based twelve focus group interviews aimed to gather opinions from young Polish participants regarding a range of innovative products. These products included vertical home gardens, which involve small shelves with plants, enabling consumers to grow specific edible plants within their homes. Additionally, participants were asked to assess smoothies made from vegetable waste, such as watermelon rinds, as well as functional snacks with detailed information regarding their beneficial nutrients. Other evaluated concepts encompassed plant-based meat substitutes that mimic the taste of meat while being sourced from plants, novel applications of cannabis in the form of hummus or pesto, alternative proteins derived from plants and microorganisms incorporated into food products, the production of "ugly products" utilizing natural ingredients and waste, adult soft drinks designed to resemble alcoholic beverages, farming insects and worms for use as food ingredients, and lastly, beer produced using water reclaimed from sewage treatment plants. The market potential of the afore-mentioned products has lately been widely explored in various countries discussing these topics in the context of food innovation creation, sustainability, and consumer acceptance, reflecting a focus on developed markets and their associated food industry trends and developments. However, based on the secondary data availability analysis, the exploration of these issues seems to be more prevalent in the United States (US) than Europe. For example, such innovative product as beer produced by using water reclaimed from sewage treatment plants has only recently appeared on the European market, while in the US it has been offered to consumers already for ten years, as reflected by several scientific and practical studies published by Huen (2018), Boudway (2023), and Annin (2023).

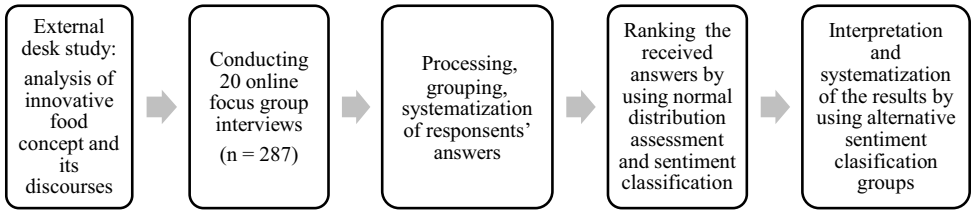


Figure 1. Research methodological steps (source: created by authors)

Research participants were asked both open and closed type questions. In the beginning participants were asked to rate creative solutions in food industry on a Likert scale (LS) ranging from 1 to 5, in order to assess their agreement with statements such as *I believe it is an excellent idea*, *I think it benefits everyone*, *I believe it is beneficial for the environment*, and *It is worth purchasing despite having a higher price than average*. The questions were presented to focus group participants in a progressive order, moving from complete rejection to complete acceptance of the ideas. At the end of the evaluations, respondents had a discussion on what they thought the average consumer would think of such innovations in an open question.

Before the study, the researchers made sure that the chosen audience was knowledgeable and qualified to answer the specific questions, and those respondents who did not meet the authors' criteria were excluded from the focus group respondents. During the focus group interviews, the researchers recorded answers, which were afterwards processed and systematized. Consequently, a total of 185 opinions was collected in Poland, with 90 responses from women, 90 from men, and 5 participants who preferred not to disclose their gender.

In Latvia, same methodological approach was used. In May–June, 2023, the authors conducted eight focus group interviews, which included 102 qualified respondents.

Since Latvia has a significantly smaller population than Poland, there were only eight focus group interviews conducted to ensure a representative sample. Also, limited time for data collection, resulted in different number of focus groups surveyed in each country based on research project efficiency and logistical considerations.

In order to gain a deeper understanding of the survey results in Poland and Latvia about various food innovations, further in the research the authors applied a fuzzy data-driven product ranking model using sentiment analysis and multi-criteria classification based on scientifically validated methods (Dahooie et al., 2021; Eslami et al., 2018).

The purpose of the ranking was to create scenarios of statements that would correspond to positive–positive (POS–POS), positive–negative (POS–NEG), negative–positive (NEG–POS), for negative–negative (NEG–NEG) alternatives. In order to create such alternative groups, firstly, the method of sentiment classification was used; secondly ranking of answers (LS) and fuzzy set theory (FST) based on Zimmermann's (1996) recommendations on FST applications were applied to classify the qualitatively obtained data.

3. Results

First and foremost, the participants were interviewed regarding their receptiveness towards various food innovations. The results are displayed in Figure 2, revealing intriguing patterns in their responses.

Notably, some innovations garnered unequivocal acceptance, with three of them receiving strong endorsement, while another three faced distinct rejection, and the rest evoked mixed sentiments. The innovations with the highest acceptance were functional snacks (with 97 positive indications, accounting for 52.4% in Poland and 93 positive indications, amounting to 91% in Latvia), vertical home gardens (87 indications, 47% in Poland, and 91 indications, 89% in Latvia), and alcohol-free drinks (71 indications, 38.4% in Poland, and 63 indications, 62% in Latvia). Conversely, negative reactions were directed towards beer based on water

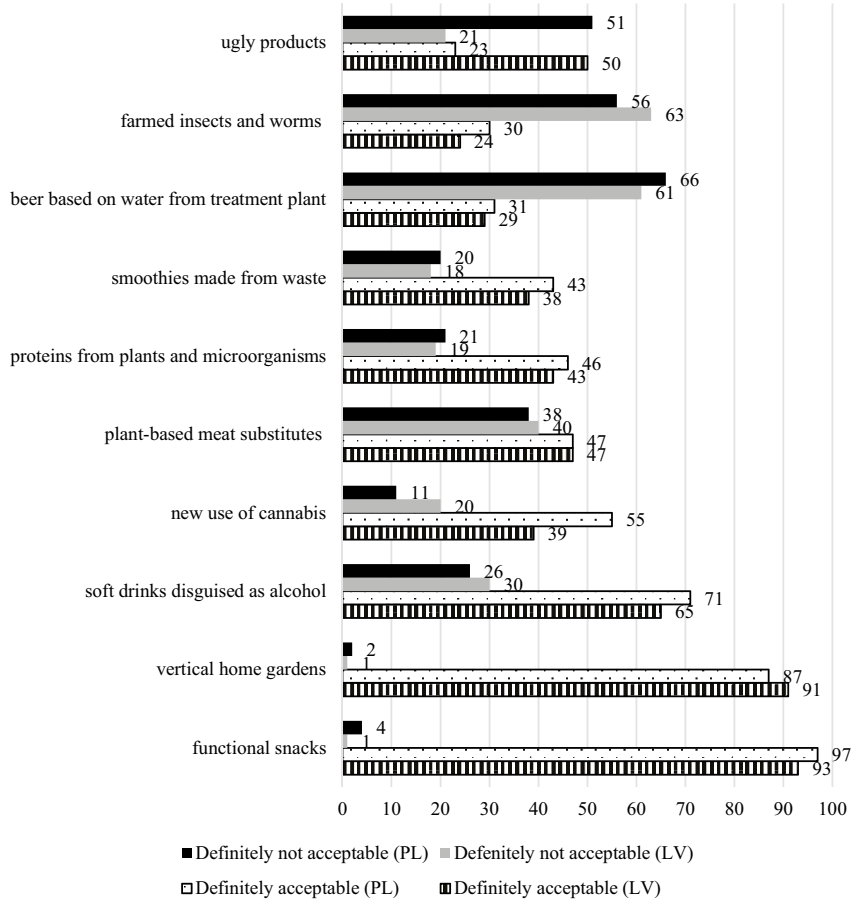


Figure 2. Positive and negative reactions regarding food innovations in Poland (n = 185) and Latvia (n = 102) (source: created by authors)

from treatment plants (66 negative indications, 35.7% in Poland, and 61 negative indications, 60% in Latvia), farmed insects and worms (56 negative indications, 30.3% in Poland, and 63 negative indications, 62% in Latvia), and ugly products (51 indications, 27.6% in Poland). Additionally, mixed feelings were expressed about products like plant-based meat substitutes, proteins from plants and microorganisms, or smoothies made from waste in both Poland and Latvia, although the level of opposition was less pronounced compared to the previously mentioned items.

It is evident that consumers sometimes do not accept creative solutions (Figure 3) – when they were asked what is good for everyone, more negative than positive indications were given to beer based on water recovered in a sewage treatment plant (in Poland – 22 positive *versus* 63 negative; in Latvia – 19 positive *versus* 64 negative), farmed insects and worms (in Poland – 19 positive *versus* 64 negative; in Latvia – 19 positive *versus* 65 negative), and ugly products (in Poland – 12 positive *versus* 52 negative; in Latvia – 46 positive *versus*

22 negative). Again, three innovations received the most positive reviews: functional snacks (in Poland – 78 positive indications, 42.1%; in Latvia – 81 positive indications, 80%), alcohol-free drinks (in Poland 54 positive indications, and 29.2%), and vertical home gardens (in Poland 39 positive indications, 21%, in Latvia – 49 positive indications, 48%). The study revealed an intriguing contrast between Poles and Latvians regarding their attitudes towards the new use of cannabis. Positive indications in Latvia amounted to 25%, whereas in Poland, it was only 20%. The authors attribute this difference to Poland's more conservative cultural background, influenced by traditional values and historical experiences, which might shape attitudes towards recreational drugs like cannabis. On the other hand, Latvia's more open economy, exposed to diverse cultural influences, may foster more accepting attitudes towards such creative solutions. Moreover, unlike Poles, Latvian society does not consider that population consumes too much alcohol and therefore is not ready yet to accept non-alcoholic drinks that are using creative ways to form associations with alcohol.

Subsequently, the participants were questioned about the environmental impact of the innovations (Figure 4). Notably, the products that received the most favorable reviews

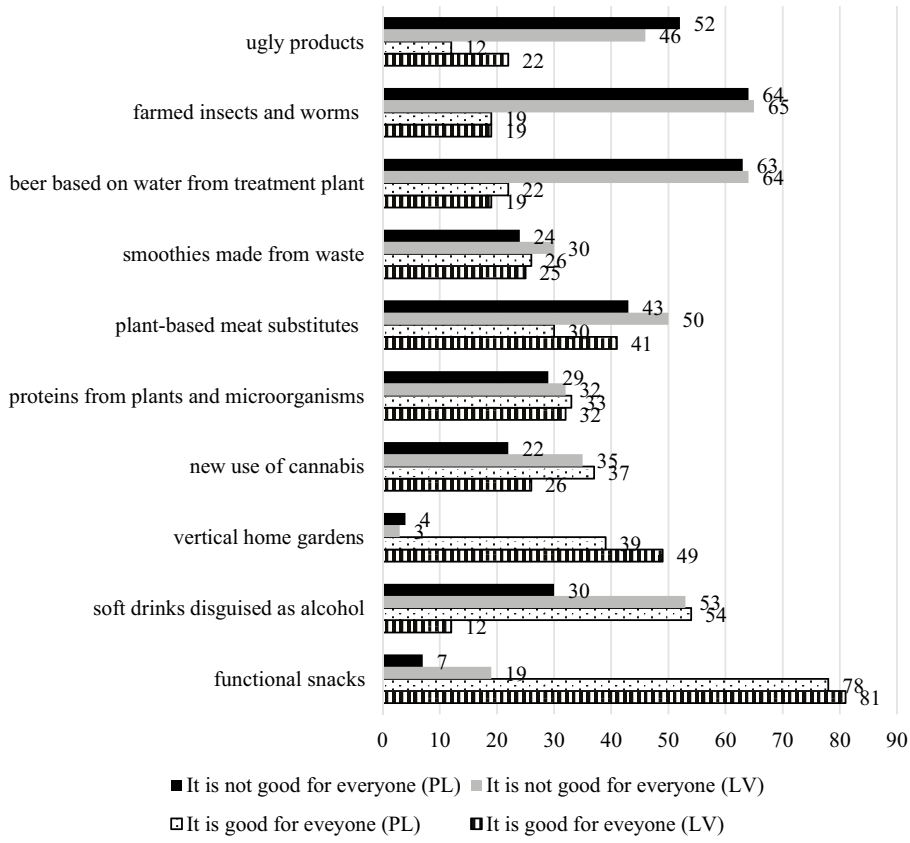
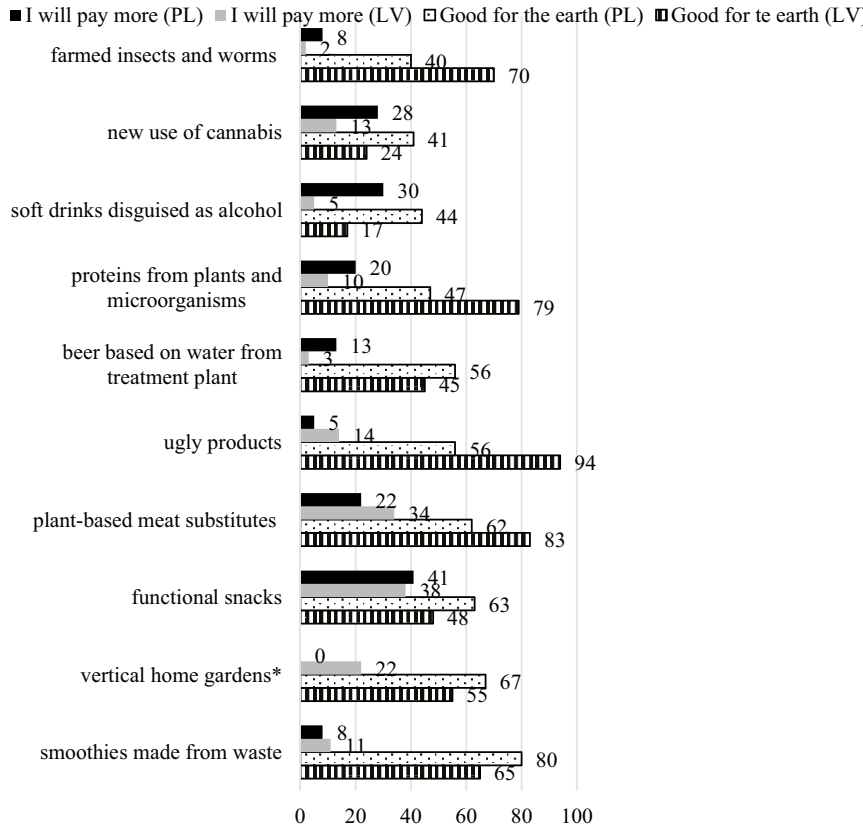


Figure 3. Respondents' opinion on the benefits of food innovations in Poland (n = 185) and Latvia (n = 102) (source: created by authors)

earlier are revisited, albeit with changes in their ranking. In Poland, the smoothie made from vegetable waste emerges as the most ecologically resource-friendly creative solution, with 80 positive indications (43.2%). Conversely, in Latvia, "ugly products" obtain 94 positive indications (92.1%), followed by plant-based meat substitutes with 83 positive indications (81.3%), and farmed insects and worms with 70 positive indications (68.6%) followed by evaluations of Polish respondents' for vertical home gardens received (67 positive indications, 36.2%). Overall, respondents express significantly positive evaluations of the innovations in terms of their eco-friendliness, with average positive indications being 55.6 (30%) in Poland and 58 (57%) in Latvia, indicating a recognition of their positive impact on the Earth.

One question was open and respondents could enter their thoughts. Answering to what in their opinion an average consumer would think of such creative solutions. Below in the text, the authors have collected some quotes describing the attitude of the audience:

> "Some of the creative solutions in the survey might spark controversy, especially those related to sewage or insects, which people associate with something repulsive and unclean. I believe that offering these products at a lower cost than traditional ones could



* *Note:* vertical home gardens – here the answer was *I will do it.*

Figure 4. The willingness to pay more for creative solutions which are good for the Earth in Poland (n = 185) and Latvia (n = 102)

make it easier to persuade people to embrace these ideas. It's a win-win situation, as these ingredients would otherwise go to waste, benefiting both consumers and the environment" (Poland);

"For me as a buyer, the creator of the innovation, their reputation, and publicity surrounding the product are essential aspects. Knowing who is behind the innovation and their track record influences my perception and willingness to try something new" (Latvia);

"Consumers might be hesitant to try something new; it takes time for people to accept and adapt" (Poland);

"I believe opinions will be diverse. The survey gave me mixed feelings. Some of the products seem intriguing, while the thought of others is quite repulsive. It really depends on the individual" (Poland);

"Apart from the innovation itself, availability and accessibility are crucial factors for me as a customer. If the innovative products I want to buy are not readily available in stores, it makes it challenging for me to switch from my conventional choices to the new ones" (Latvia);

"People's responses will vary. Some may like it more, while others may be less enthusiastic. I don't anticipate overwhelmingly positive reactions overall" (Poland);

"I believe that initially, there might be limited interest in introducing these creative solutions and substitutes into food products. However, with effective publicity, social media coverage, and TV exposure, certain communities may gradually adopt these solutions in their households" (Poland);

"Personally, I would only purchase the mentioned food innovations if there is solid evidence supporting their positive impact on the planet and people. Greenwashing is a significant concern in Latvia, and I tend to be skeptical about products that merely position themselves as 'innovative'. I prefer a more informed approach before embracing new products" (Latvia).

It is evident that the respondents personally either do not have a clear opinion about the presented innovations, or the opinion is negative. In the comments of the respondents, however, it is visible what they lack – information and promotion, above all. Therefore, for deeper insight into the attitudes of the respondents, the authors further tried to explain possible alternative strategies that could influence the behavior of young consumers. In the further analysis of survey results, a group of responses was selected that included positive and negative responses about food innovation, and these responses were ranked and transformed using normal distribution scores in order to evaluate groups of alternatives. The purpose of the ranking was to create scenarios of statements that would correspond to: POS–POS, POS–NEG, NEG–POS, and NEG–NEG alternatives. In order to create such alternative groups, the method of sentiment classification was used, and ranking of answers (LS) as well as FST were applied to classify the qualitatively obtained data.

3.1. Characteristics of the selected classification groups

- POS–POS: ratings with positive answers above the normal distribution of the average ranking determine a stable positive attitude of the consumer towards food innovations and, according to sentiment classification, shows consistently stable resistance to the evaluation criteria;

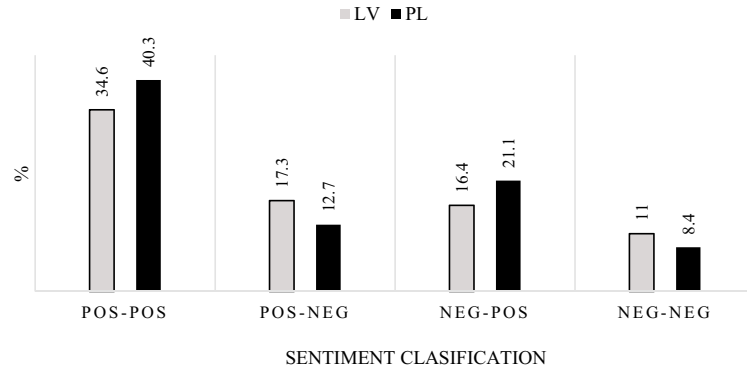


Figure 5. Ratings of consumer sentiment strategies by alternative groups in Latvia and Poland, % (source: created by authors)

- POS–NEG: ratings with positive answers below the normal distribution of the average ranking determine the consumer's fluctuating attitude towards food innovations, and sentiment evaluations show that under a certain influence (marketing, consumption habits, changes in public opinion, *etc.*) the consumer could change his/her attitude in both positive and negative direction;
- NEG–POS: evaluations with negative answers above the normal distribution of the average ranking express a fluctuating negative evaluation of creative solutions in food industry, and under a certain influence could change and become positive or stable negative;
- NEG–NEG: ratings with stable persistent and negative responses below the normal distribution of the average ranking are those consumers currently strongly negative towards food innovations and it is problematic to change their influence.

As revealed in Figure 5, the Polish group of respondents is slightly more positive towards food innovations than the Latvian group, because POS–POS classification includes 40.3% of the statements, while Latvia's is only 34.6%. In the POS–NEG group, the Latvian group of respondents makes up 17.3%, and the Polish 12.7% – this shows that it is possible to convince the Latvian consumer group to change their attitude to a stable positive one and this attitude towards food innovations can be evaluated as more moderate and more expectant. However, the evaluation of the negative alternatives leads to the conclusion that Latvian respondents still evaluate food innovations with negative caution, which is confirmed by the fact that the group of statements (11%) that corresponds to the NEG–NEG scenario is relatively large, thus these respondents have taken a stable negative and waiting position towards food innovations. In the group of Polish respondents, it is positive that there are 21.1% of statements in the NEG–POS scenario, which shows that this attitude towards positive marketing and shift in consumer attitudes can change to a positive attitude towards creative solutions in food industry.

4. Discussion

So far, the food industry is described as being big on trends and innovation, with a focus on embracing fresh technologies, ingredients, and methodologies to stay on consumers' radars. This emphasis on creativity and innovation in the food industry reflects the connection

between creative directions and consumer engagement (StellaPop, 2024). However, it is important to acknowledge that the concept of a homogeneous "European", "Spanish", or "Polish" customer does not hold true, as individuals' cultural, social, and political characteristics can differ significantly based on historical context, economic development, regional disparities, religion, and personal experiences (Vanhonacker et al., 2010; Dudin et al., 2014). Similarly, the acceptance of creative solutions in food industry, including food novelties, varies among societies and individuals (Yeniyurt & Townsend, 2003). Younger generations are often considered more open to innovations due to their exposure to rapid changes and technological advancements (Packalen & Bhattacharya, 2019; Boonpracha, 2022), but there are exceptions to this generalization, as observed in the obtained results. Various factors such as education, socio-economic background, cultural upbringing, and personal beliefs influence individuals' openness to innovations (Sparke & Menrad, 2011). Traditions and culture also play a role in the acceptance of innovations. In Western cultures, insects are generally considered non-edible, leading to prevalent rejection of insects as food (Hémar-Nicolas et al., 2022; DeFoliart, 1999). Similarly, the trend of *Instagram-Able Food* among young people, which prioritizes visually appealing and pristine dishes, may explain the reluctance to embrace imperfect products (Alphonce et al., 2020).

Governments and organizations implement regulations and policies to reduce food waste, and some consumers are motivated to accept innovations connected to waste reduction for the purpose of making a positive impact on the world (Batat, 2019; Kuksa et al., 2022, pp. 211–242). However, not all respondents showed a willingness to personally engage in innovative consumption. Innovations related to health, safety, and convenience tend to receive more positive responses from consumers (Fraj-Andrés et al., 2023). Also, marketing and promotion play a crucial role in influencing consumer attitudes towards new food products (Ozcaglar-Toulouse, 2007; Schenker et al., 1990).

The authors' study indicated that while the majority of respondents understood the need for sustainable consumption and accepted the presence of creative solutions in food market, yet they were less willing to personally consume such products or pay more for them, which has been confirmed also by former studies of (Zvirbule et al., 2023). As confirmed in the study of changing values of millennials and centennials towards responsible consumption and sustainable society, the concerns about processed foods, artificial additives, and genetically modified organisms contribute to consumer hesitancy (Jasrotia et al., 2023). Therefore, with time, attitudes towards certain innovations, such as farmed insects and worms, may change as people become more interested in sustainable and alternative food sources (Frewer et al., 2003).

5. Conclusions

While it is generally acknowledged that younger generations tend to be more receptive to new ideas compared to older ones, it is crucial to recognize that this is not an all-encompassing statement. Various individual and contextual factors play a role in determining one's openness to creative solutions. Cultural identity can be significantly linked to food, embodying the traditions, customs, and beliefs of a specific community. Sharing and savoring traditional foods reinforce a sense of belonging and identity. As a result, individuals, including

young people, hold an emotional attachment to the foods they grew up with and may be resistant to change. To encourage acceptance of innovative food products, information about the issues they address is essential, be it individual, societal, or environmental concerns – consumers require motivation.

The attitudes of Polish and Latvian consumers towards innovative products and creative food consumption solutions are mixed. While they recognize the need for sustainable consumption and perceive the benefits of these innovations, they are personally hesitant to adopt them and are unwilling to pay a premium over regular food products. Respondents expressed reservations, suggesting that acceptance of innovative products may take time to become widespread. Although Latvia's more open economy, exposed to diverse cultural influences, might foster more accepting attitudes towards creative solutions in food industry, Latvian respondents' answers showed they evaluate food innovations with more negative caution and prejudice compared to Polish respondents and are more demanding for explanation and solid evidence supporting products' positive impact on the planet and people.

Introducing novel foods and creative products to the younger generation can be enticing by highlighting benefits like sustainability, taste diversity, and health consciousness. Such awareness creation campaigns ought to possess clarity and simplicity in their presentation, facilitating comprehension for the youth, while concurrently ensuring the delivery of an unequivocal message devoid of any semblance of insincerity or extraneous content. It is crucial for innovative food producers to comprehend consumer behavior, ensuring transparency regarding the product's content, motivating consumers to try unconventional foods, and highlighting the personal and societal benefits of purchasing these products.

In conclusions, although individuals have the autonomy to make decisions, various factors can influence and constrain their choices in alignment with their best interests. Addressing these factors may necessitate a combination of individual initiatives, policy interventions, and systemic changes.

This article presents only limited reflection of the factors related to the acceptance of food innovations in the BS region, and the topic remains far from exhaustive. Several other interrelated and important factors warrant further research, such as the price flexibility of innovative food products, their availability in distribution channels, the pricing policies of producers, and the extent of information provided to consumers in potential promotional campaigns.

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