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CHANGES IN THE POLISH MARKET FOR AGRICULTURAL ORGANIC PRODUCTS

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ABSTRACT: This paper attempts to identify changes in the factors influencing the functioning and evolution of the Polish market for organic agricultural products. It brings together the results of surveys of farmers (carried out in 2011, 2019, and 2021), distributors (carried out in 2019 and 2021), and consumers (carried out in 2009 and 2021). Initially, farmers believed that the greatest opportunities for market development lay in demand factors, including in particular consumer environmental awareness. In 2021, their opinions worsened in this regard, which means that they had difficulties in reaching consumers. Another opportunity that was less popular than before was the EU subsidies. This is due to administrative and bureaucratic burdens, which, along with high production costs and weak links between farmers and distributors, were considered to be the biggest barriers to market development. For distributors, the survey produced similar conclusions. According to consumers, the greatest opportunities for market development result from increasing environmental awareness increased diversity of products and better promotion. The barriers they highlighted include high prices, limited environmental education, lack of adequate state support, and insufficient information about the offer.

KEYWORDS: sustainable agriculture; organic farming; ecological products markets, opportunities and limitations of development

Introduction

The organic food market is growing rapidly in the European Union (EU). In 2020, the area of organic crops accounted for 9.2% of the total agricultural area, and sales amounted to EUR 44.8 billion (Trávníček et al., 2022). Germany and France recorded the highest organic food sales (EUR 15.0 billion and EUR 12.7 billion respectively). The highest market shares for organic products were achieved in Denmark (13.0%), Austria (11.3%), Luxembourg (9.1%), and Sweden (8.7%) (Willer et al., 2022). The development of organic farming is an important element of the European Green Deal. According to the farm-to-fork strategy, organic food is expected to account for 25% of the EU's cultivated area by 2030 (European Commission, 2020).

In Poland, in the period from accession to the EU in 2004 to 2013, there was a dynamic increase in the number of farms (by 24.8 thousand, i.e. 617% more than in 2004) (Kociszewski & Graczyk, 2021) and the cultivated area (by 587 thousand ha, i.e. 710% more than the baseline). Between 2013 and 2020, there was a decrease in the number of farms (by 24%, i.e. to 19.2 thousand) and in the cultivated area (by 27%, i.e. to 509 thousand ha, which accounts for 3.5% of the total agricultural area). Between 2004 and 2020, the number of operators involved in the preparation of organic agricultural products increased from 55 to 1,104. In 2020, there were 668 organic processors and 218 operators involved in the preparation and packaging of organic products. Other operators were not engaged in organic product activities (Żakowska-Biemans, 2022). The value of sales in Poland is still relatively much lower than in the EU. In 2019, it accounted for EUR 300 million (at gross retail prices). In 2020, there was a 20% increase and the value of sales accounted for a 0.45% share of the total food sales value. This compares to 4% for the EU as a whole (Kociszewski & Graczyk, 2021). The organic food market will grow by 9.4% each year and will reach around EUR 600 million by 2026 (Żakowska-Biemans, 2022).

It is worth determining the factors that influence these processes based on the analysis of the attitudes and expectations of producers and consumers. The aim of this paper is to identify changes in the factors influencing the functioning of the Polish market for organic products of agricultural origin and the factors affecting the future development of the market. The paper brings together 2009, 2011, 2019, and 2021 survey results to show how market development factors changed over time. The survey was conducted in parallel on the supply side (conventional farms, 2011 and 2019; certified organic farms, 2011, 2019, and 2021) and on the demand side (consumers, 2009 and 2021). In 2019 and 2021, the survey was extended to include distributors. The survey gathered the opinions of farmers, distributors, and con-

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sumers on the opportunities for and barriers to the development of the organic food market. The results are checked against selected references from literature and secondary sources. The final part provides recommendations for actions to support further development of sales of organic farming products.

Literature overview

Previous studies concerning the supply side of organic farming mainly focused on the development of production potential in terms of the number and area of farms on a global and macroeconomic scale (Runowski, 2012; Łuczka-Bakuła, 2007) and the interplay of economic (Torres et al., 2016), ecological, and social aspects (Zaher et al., 2016; Tuomisto et al., 2012; MacRae et al., 2007; Seufert et al., 2012). Studies conducted during the impeded development of organic food production mainly focused on the functioning and efficiency of organic farm production (Komorowska, 2013; Brodzińska, 2014; Nachtman, 2015; Gil, 2016). They indicate that there were barriers exacerbating the decreasing level of public support for farm development and the formation of producer groups. Other barriers, as indicated by farmers who acted as producers or considered the conversion of their farms towards organic production, included the difficulties of sale of organic products, weak involvement of state institutions, lack of strong organisations representing the political and economic interests of organic farming actors, the reluctance of farmers to cooperate, and excessive bureaucratic burdens. Furthermore, the production activity is burdened by a significant risk of weather changes and the need to maintain a stable raw material base. The latter entails the need to develop a model of cooperation with suppliers (Żakowska-Biemans et al., 2020). Another weakness of organic farming in Poland is the problem with the transfer of knowledge to agricultural practice, including the lack of a sufficient number of advisors specialising in organic farming (Sołtysiak, 2021).

Organic food processing was hardly examined in Poland and other countries in terms of market environment except for several studies (Łuczka, 2016a; Smoluk-Sikorska et al., 2017). The weak point of the organic food market was the relationship with market participants, suppliers, and customers. The number of organic food processing enterprises was insufficient in relation to the number of organic farms, and their production structure was unfavourable in terms of demand. The supply was dominated by cereal products as well as fruit and vegetable products, while consumers were largely interested in dairy and meat (Łuczka, 2016b). Another barrier was the unfavourable production structure in organic farms, including the low

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share of farms with animals in the organic farming system, adversely affecting the sustainability of production (Sołtysiak, 2021).

Producers and processors declared their willingness to cooperate and the need to organise local and regional distribution channels, but the cooperation was limited in practice. There was also a lack of adequate communication between the food processing sector and producers. In this respect, barriers to the development of the organic food market included the lack of market organisation, the lack of cooperation at the producer, processor, and trade levels, and the lack of trust in partners. The development of the Polish market for organic food is hampered by disproportionately high prices of final products in relation to the prices of agricultural products resulting from low supply and high margins charged by intermediaries (Grzybowska-Brzezińska & Gorlowa, 2019). Average margins are 40% in specialist and grocery shops and 20% in retail networks (Smoluk-Sikorska, 2017).

The distribution of organic food in Poland has a number of weaknesses due to low and irregular supplies and the dispersion of producers and intermediaries. The main distribution channel was sales to small retail outlets, followed by wholesale. More than half of the processors surveyed sold their products abroad, but these were low-processed products (Smoluk-Sikorska, 2019). There are at least 850 shops specialising in the sale of organic food, with an average sales area of 60 m^2 (Żakowska-Biemans, 2022). Sales of organic processed food and fresh produce are expanding, but the supply of fresh domestic produce, especially seasonal fruit and vegetables, does not fully meet demand. As a result, these products are imported from other EU member states and third countries. In 2020, there was a 23.2% increase in imports compared to 2019 (Żakowska-Biemans, 2022). From the point of view of the development of domestic production by Polish producers and processors, this is an unfavourable process. On the other hand, the development of organic food sales in large-format shops and discount shops increases consumer interest in organic food. The development of the distribution of organic food via online shops is also accelerating, especially in the era of the COVID-19 pandemic. Smaller producers sell their products directly at local fairs, bazaars, and marketplaces. Developing direct sales and shortening supply chains is one of the key priorities of national rural and agricultural development policy (Żakowska-Biemans, 2022).

Most of the weaknesses in the development of Polish organic farming correspond with those identified in the Framework Action Plan for Organic Food and Farming in Poland for 2021–2027 (Ministerstwo Rolnictwa i Rozwoju Wsi, 2021). The plan also draws attention to the low interest of farmers in carrying out organic livestock production due to, among others, the low supply of organic reproductive material and the lack of development of its production.

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In presenting the literature review on the market for organic agricultural products, reference should also be made to the results of research on the demand side and consumer behaviour in the market. Research has sought to identify various factors influencing organic food purchase intention and consumption using value theory and rational choice theory (Knowledge-Attitude-Behaviour Model, Theory of Reasoned Action, Theory of Plan Behaviour) and ethical and normative models (Norm Activation Model, Value-Beliefs-Norm Model). Studies have examined various factors of consumer behaviour in the market for organic agricultural products, including individual factors (demographic variables, life values, environmental and health concerns, animal welfare, ethical beliefs, attitudes, and lifestyles) and socio-cultural factors that affect individual factors (social norms, media influence, cultural values) (Golob et al., 2018; Pham et al., 2019; Nosi et al., 2020; Katt & Meixner, 2020).

Another area of research to date identifies factors limiting the consumption of organic agricultural products, such as price and financial barriers, distrust of organic certification and labelling, habits (buying conventional food products), unavailability of products, and insufficient differentiation (Hughner et al., 2007; Kushwah et al., 2019; Bryła, 2016; Van Doorn & Verhoef, 2015). The barriers to market development also involve mental and marketing barriers (Grzybowska-Brzezińska, 2013), including the little extent to which organic market players benefit from the experience of companies implementing modern marketing concepts (Pilarczyk & Nestorowicz, 2010).

In this case, price is affected by the transition from the post-Engel phase (Engel's law no longer applies as the increase in income does not affect the level of expenditure on food) to a phase with a relative increase in expenditure on food under conditions of increased income. This is due to an increase in expenditure on organic food, which is relatively more expensive than non-certified organic food (Kieżel, 2010).

The literature also emphasises the role of environmental awareness as a key factor motivating consumers to behave in an environmentally friendly manner. Environmental awareness is shaped in a complex process influenced by factors of different natures, such as social norms, state regulations, and market communication channels (Poskrobko, 2007; Nycz-Wróbel, 2012). A higher level of environmental awareness translates into greater involvement in the purchase of organic products.

On the other hand, although consumers often express positive attitudes towards sustainability and organic products and feel concerned about the state of the environment, this does not always translate into their purchasing behaviour (Bray et al., 2011). This is evidenced by research findings on consumer behaviour from various countries, including the UK, Belgium, and

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Sweden (Tanner & Kast, 2003; Vermeir & Verbeke, 2008; Vermeir & Verbeke, 2006; Hughner et al., 2007). This shows that consumers sometimes exhibit "contradictory behaviour in green purchasing;" there is a gap between positive attitudes towards the environment and ecology and the actual behaviour in purchasing organic products.

Furthermore, with regard to the state of research on food, including organic food, the hierarchy of life values is incompatible with the food attributes valued by consumers and their behaviour. Although consumers see health as the overriding value in their lives, they often seek mainly pleasure in food consumption. This reflects the conflict between incommensurable value scales in relation to food (Gutkowska, 2007).

Equally importantly, the literature indicates that the impact and importance of the drivers and barriers to the consumption of organic farm products vary depending on the category of farm product and the level of socio-economic development of the country (Nguyen et al., 2021).

The demand side and the supply side of the market are usually considered separately; there are no studies presenting the dependencies and relations between them concerning the mechanisms of market functioning in light of the supply chain. The current state of research defined above indicates a research gap in analysing the perspectives (opportunities and barriers) of market development based on the connections between the links in the value chain and the challenges resulting from the contemporary policy of the European Union and changes in the global food market. Therefore, the drivers and barriers to demand and supply growth, as well as relations between farmers, distribution areas, and consumer expectations towards organic products, should be investigated. Furthermore, an attempt should be made to determine how to reduce these barriers and strengthen these drivers so as to contribute to increasing the degree of utilisation of the domestic agricultural production potential. The research problem that needs to be addressed is what changes have taken place in the development of the Polish organic food market on the demand and supply side in terms of its opportunities and barriers. The aim of this paper is to identify changes in the factors influencing the functioning and development of the Polish market of organic products of agricultural origin.

Research methods

Supply-side surveys were conducted in three stages (in 2011, 2019, and 2021) by specialised external companies using CATI and CAWI methods based on questionnaires prepared by the project authors. The selected nationally representative sample of farmers reflects the area structure of

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organic and conventional farmers and the distribution of the number of farms between voivodships. In 2011, the size of the survey sample was 420 farms (n = 420) with an agricultural area of more than 1 ha, including 350 conventional farms (n = 350) and 70 organic farms certified for organic farming (n = 70). In 2019, the total sample size was n = 325, including farmers using organic farming methods (n = 65) and farmers officially not using organic farming methods (n = 260). The 2021 survey was carried out only among farmers certified for organic production (N = 120). The distributor survey was conducted in 2019 with a sample of 75 organic distributors. In 2021, the sample size in this group was 120 (N = 120).

Demand-side survey sample sizes were as follows: 1,002 respondents in 2009 (including 300 consumers who purchase certified organic products and 702 respondents who do not) and 1032 respondents in 2021 (including 509 respondents who purchased an organic product in the last 3 months and 523 respondents who did not).

As the individual groups of respondents in supply-side surveys were defined differently and the individual responses were obtained in a different manner, the responses were aggregated where possible. The responses were obtained from conventional and organic farmers using a nominal scale (in 2011 and 2019) and from organic farmers using an ordinal scale (in 2021). For the purposes of this study (to compare the results from the three years), the responses in the latter group were converted from an ordinal scale to a nominal scale. These responses, as well as the responses obtained from conventional farmers in 2011 and 2019, were analysed based on the frequency of responses. The factor analysis was only applied to the 2021 survey of organic farmers and to the 2019 and 2021 survey of distributors allowing a comparison between 2019 and 2021 in the latter group. The aim of the factor analysis was to determine the structure of the latent factors (opportunities and barriers to the development of the market for organic agricultural products).

On the demand side, material collected in consumer surveys from 2009 and 2021 was used to analyse what are the drivers and barriers to the development of demand for organic agricultural products. The analysis of the frequency of responses (for the 2009 data) and the exploratory factor analysis (for the 2021 data) was used separately for opportunities and barriers.

The exploratory factor analysis was used to identify the latent factor structure of opportunities and main barriers to the development of organic production according to supply-side actors. The responses regarding opportunities and barriers to development varied in the surveys of organic distributors and farmers in 2019 and 2021 (different factors and different numbers of factors were used). Therefore, the factor analysis was carried out separately for opportunities and barriers and for the responses obtained from

DOI: 10.34659/eis.2023.84.1.547

farmers and distributors in 2019 and 2021. The factors (opportunities and barriers) were assessed by the respondents on a 7-point scale (1 – very insignificant, 7 – very significant). The same scale can be used to compare the average assessments of the respondents. The validity of the use of the factor analysis is each time evidenced by (i) a high value of the Kaiser-Meyer-Olsen test (with KMO usually exceeding 0.7), proving the that the correlation matrix is adequate to the assumptions of the factor analysis, and (ii) a statistically significant result of the Bartlett's Test of Sphericity (), confirming that the correlation matrix as a whole contains significant correlation coefficients. The exploratory factor analysis was performed using the principal component analysis with Varimax rotation (with Kaiser normalisation). The Varimax rotation minimises the number of variables used to explain the common factor. The scree plot criterion was used to determine the number of components and explain at least 70% of the common variance. Four components were usually extracted (three in one case). The extracted common factors together explain between 71.4% and 78.9% of the variance, which should be considered quite high. All factors (opportunities and barriers) were included in the dimensional reduction procedure. The variables for which the Wilcoxon signed-rank test confirmed the significance of the barrier and the mean significance score was greater than 4 were only included in the 2021 responses of organic farmers and distributors regarding barriers. The reliability and high consistency of the scale used, with the number of variables defined in this way, is evidenced each time by a high value of Cronbach's alpha statistics (higher than 0.75).

The demand side of the organic food products market was analysed in a similar way. Again, the factors (opportunities and barriers) were assessed by the respondents on a 7-point scale (1 – very insignificant, 7 – very significant). The exploratory factor analysis was performed using the principal component analysis with Varimax rotation (with Kaiser normalisation). The Varimax rotation minimises the number of variables used to explain the common factor. The scree plot criterion was used to determine the number of components and explain at least 70% of the common variance. Three or four components were extracted. The extracted common factors together explain more than 75% of the variance, which should be considered high. All factors (opportunities and barriers) were included in the dimensional reduction procedure. In each case, the Wilcoxon signed-rank test confirmed the significance of the opportunity and the barrier, and the mean significance scores were greater than 4.6. The reliability and high consistency of the scale used, with the number of variables defined in this way, is evidenced each time by a very high value of Cronbach's alpha statistics (higher than 0.9). The values of Cronbach's alpha after removing individual questions are not higher than the

DOI: 10.34659/eis.2023.84.1.547

statistics calculated for the initial number of variables together, which means that there are no grounds for reducing the set of factors in the analysis.

Opportunities for the development of organic production according to farmers

In the opinion of farmers (both conventional and organic), in both 2011 and 2019 survey, the opportunity for the development of organic production lies in the growing environmental awareness of consumers, which is the most frequent response (19.7% and 22.1% of responses in 2011 and 2019 respectively). EU subsidies (18.1% and 14.8%) and growing demand (15.4% and 15.9%) are the second and third most frequent responses (Figure 1). Organic farmers also indicated the growing environmental awareness of consumers, followed by the growing demand and the popularity of ecological consumption patterns (in 2019 and 2021). In organic farms, these responses were more frequent than in conventional farms. In conventional farms, the popularity of ecological consumption patterns was in decline in the next years (7.8% of responses in 2019 compared to 15.0% in 2011). Organic farmers were least likely to indicate a favourable policy of Polish authorities (16.4% of responses in 2011 and 5.4% in 2019). In 2021, this improved (an increase to 16.0%) but was still one of the less frequent responses.

The exploratory factor analysis using the principal component analysis with Varimax rotation was applied to the survey of organic farmers from 2021, identifying three components regarding the opportunities for the development of production and increased sales in Polish organic farming from the perspective of farmers in 2021. The first common factor is a leading factor explaining 35.6% of the common variance.

It takes into account six variables (opportunities) with high factor loadings indicating a rather strong association with the common factor, i.e. increased cooperation between organic distributors (0.848), increased cooperation between organic distributors and farmers (0.821), increased cooperation between farmers (0.767), the relevant policy of Polish state institutions supporting organic farms (0.755), EU subsidies (0.712), and implementation of innovation by Polish agri-food companies producing organic products (0.650). This component determines the conditions for good functioning and cooperation of agricultural producers as well as support from micro and macro environment entities, shaping the institutional dimension of the development of organic agriculture.

The second common factor explains 23.3% of the common variance and is strongly associated with three variables, i.e. the growing demand for organic products (0.882), the growing environmental awareness of consum-

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ers (0.849), and the popularity of ecological consumption patterns (0.746). It reflects environmentally friendly consumer behaviour. The third component (13.8% of the variance) is formed by two factors: lower quality of conventional food compared to organic food (0.896) and better distribution (0.637). Due to the very high first factor loading, the component identifies the quality of organic food.

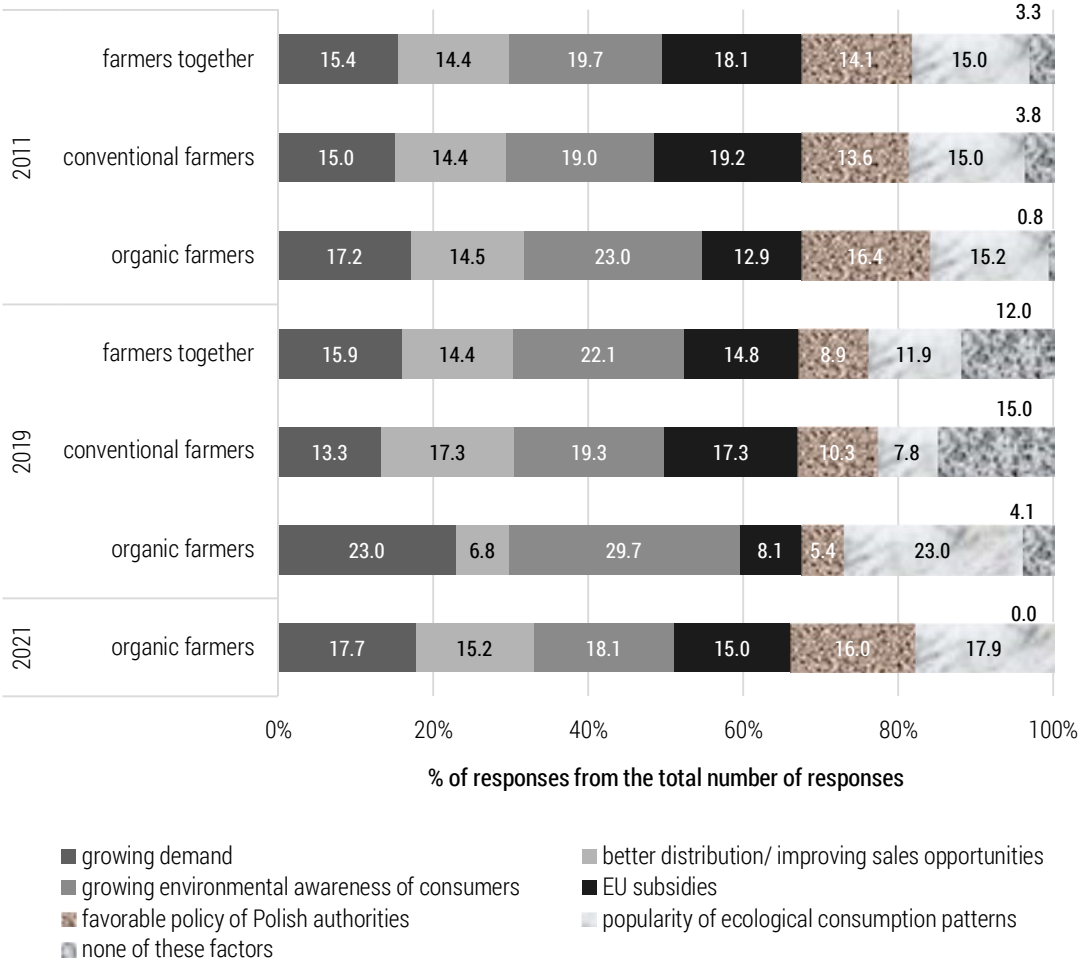

Figure 1. Opportunities for the development of organic production in 2011, 2019, and 2021. Distribution of farmers' responses

DOI: 10.34659/eis.2023.84.1.547

Opportunities for market development according to distributors

In 2019, in the opinion of distributors, the greatest opportunities for the development of sales of organic farming products in Poland lay in the growing environmental awareness of consumers (mean score of 5.88), the growing demand (5.79), and the increased diversity of organic farming products (5.37).

Table 1. Factor loadings of components[1] were obtained using the principal component analysis with Varimax rotation with Kaiser normalisation. Opportunities for the development of sales of organic farming products according to distributors in 2019 and 2021

Factor	Sales development opportunities 2019	Loading	Factor	Sales development opportunities 2021	Loading
1	Increased cooperation between organic distributors	0.830	1	Growing demand for organic products	0.868
	Increased competition between organic distributors	0.778		Popularity of ecological consumption patterns	0.833
	Increased competition between farmers	0.770		Growing environmental awareness of consumers	0.828
	Increased cooperation between farmers	0.530			
2	Growing demand	0.842	2	EU subsidies	0.851
	Increased diversity of organic farming products	0.731		Relevant policy of Polish state institutions	0.749
	Increasing environmental awareness of consumers	0.618		Implementation of innovation by Polish agri-food companies producing organic products	0.600
3	EU subsidies	0.868	3	Better distribution	0.826
				Increased cooperation between farmers	0.652
	Relevant state policy	0.839		Increased cooperation between organic distributors and farmers	0.639
4	Better promotion	0.895	4	Lower quality of conventional food compared to organic food	0.876
	Better distribution	0.805			

Notes: [1] The rotation reached convergence in 6 iterations (2019) and 8 iterations (2021).
Source: own calculations in IBM SPSS Statistics 28.0.

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In 2021, the first two factors were still popular, although slightly less compared to the 2019 survey (5.75 and 5.53 respectively). Another highly rated factor is the popularity of ecological consumption patterns (5.34).

The results of the exploratory factor analysis for the development opportunities according to organic distributors are presented in Table 1. Four common factors were extracted in 2019. The first component is loaded by four variables (the factor loadings of three of them are high). This factor covers 21.1% of the common variance. This component determines the conditions for the functioning of distributors and farmers on the market. The second component (explaining 17.3% of the variance) is loaded by three variables (the factor loadings of two of them are high). It reflects environmentally friendly consumer behaviour. The third component is formed by two factors (EU subsidies and relevant state policy). It explains 16.8% of the common variance and determines external financial and legal support. The fourth component concerns access to organic food. It is formed by two factors (better promotion and better access). Their high loadings prove a strong association with the component. This factor is equivalent to the third component in terms of explaining common variance (16.3%). In 2021, four components were also extracted.

The first component is made up of three variables with high factor loadings and explains 25.5% of the variance. It reflects environmentally friendly consumer behaviour. The second component is loaded by three factors (the factor loadings of two of them are high, explaining 23.9% of the variance). It determines external legal and financial support. The third component explains 18.7% of the variance. It is formed by three factors, of which "better distribution" is the most strongly correlated with the component. It determines the conditions for the functioning of distributors and farmers on the market. The fourth component identifies the quality of organic products. It takes into account only one factor with a high loading (0.876, explaining 10.8% of the common variance). Note that similar common factors were obtained in the subsequent research periods despite different opportunity specifications. Two of them (environmentally friendly consumer behaviour and financial and legal support) became more important as sales development opportunities over time.

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Opportunities for the development of organic production according to consumers

Table 2. Factor loadings of components[1] obtained using the principal component analysis with Varimax rotation with Kaiser normalisation. Opportunities for the development of sales of organic farming products according to consumers in 2021 (N = 1032)

Factor	Opportunity	Loading
1	Growing demand for organic products	0.798
	Better distribution	0.746
	Growing environmental awareness of consumers	0.739
	Increased diversity of organic products	0.715
	Better promotion	0.683
	Increased cooperation between organic producers	0.666
	Increased cooperation between organic distributors	0.661
2	Increased competition between organic producers	0.858
	Increased competition between organic distributors	0.804
3	EU subsidies	0.808
	Relevant state policy	0.750

Notes: [1] The rotation reached convergence in 6 iterations.
Source: own calculations using IBM SPSS Statistics 28.0.

The analysis of the consumer opinions expressed in 2021 shows that consumers see the greatest opportunities for the development of sales of organic farming products in Poland in growing environmental awareness (mean score of 5.17), increased diversity of organic products (5.14), better promotion (5.11), and growing demand for organic products (5.06). The results of the exploratory factor analysis for the opportunities for the development of sales of organic products according to consumers are presented in Table 2. Three common factors were extracted. The first component is loaded by six variables (the factor loadings of four of them are high, exceeding 0.7). This common factor is a leading factor covering 37.1% of the common variance. This component expresses environmentally friendly consumer behaviour related to better availability and promotion as well as cooperation between producers and organic distributors. The second component (explaining 20.6% of the variance) is loaded by two variables with high factor loadings. This component refers to the increased competition between pro-

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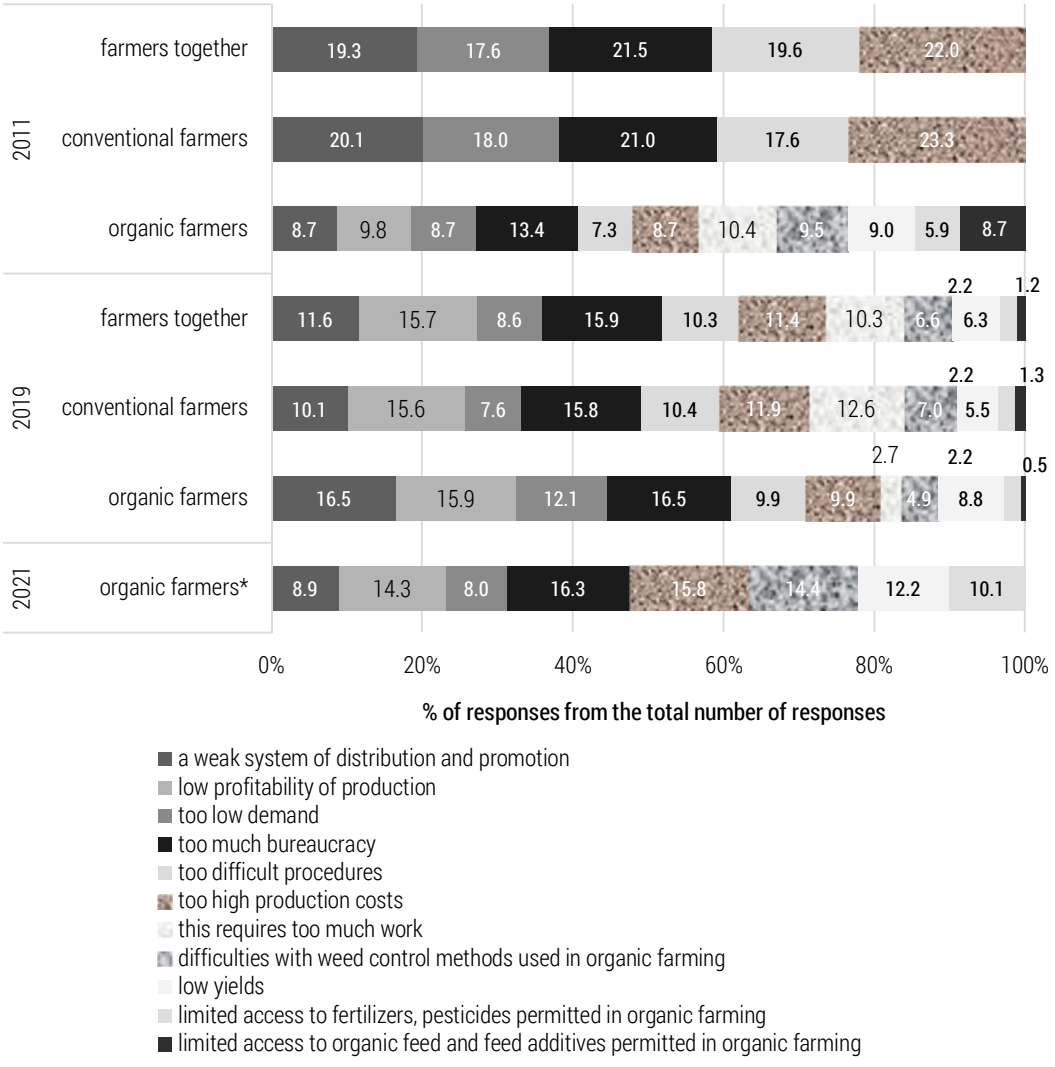
ducers and between distributors. The third component is formed by two factors (EU subsidies and relevant state policy). It explains 17.9% of the common variance and determines external financial and legal support.

Barriers to the development of organic production according to farmers

As the lists of obstacles presented to respondents were different in the subsequent surveys, the possibilities to compare the results in the subsequent years are limited.



Notes: * Barriers from the 2019 survey are included.

Figure 2. Barriers to the development of organic production in 2011, 2019, and 2021 – distribution of farmers' responses

DOI: 10.34659/eis.2023.84.1.547

In the opinion of all surveyed farmers, excessive bureaucracy (too much bureaucracy) and the weak system of distribution and promotion are key factors that make organic farming difficult (Figure 2). They were indicated in 2011 more frequently than in 2019 by all groups of farmers. In the subsequent years, the increasingly significant barriers for organic farmers included excessively high production costs, low yields, low agricultural profitability ("low profitability of production"), and a poor distribution system. These barriers were indicated more frequently in 2019 than in 2011 and less frequently in 2021 than in 2019. In the subsequent years, excessive labour input ("this requires too much work") and limited access to organic feed and feed additives permitted in organic farming were factors less frequently regarded as a difficulty.

The exploratory factor analysis allowed the identification of four components of barriers to the development of production and increased sales in Polish organic farming from the perspective of organic farmers in 2021. Three common factors have a similar percentage of variance explanation (21.6%, 19.4%, and 18.1%), while the fourth component explains 15.2% of the common variance. The first component is loaded by four factors, i.e. low yields (0.800), difficulties in applying organic farming methods (0.781), excessively high costs of organic production (0.613), and low agricultural profitability (0.589).

It identifies a barrier resulting from the specific character of organic farming. The second common factor is linked to bureaucratic and administrative difficulties (0.846) and the lack of state support (0.776). It relates to organisational and legal barriers. The third component contains two factors: an insufficient number of processing facilities (0.783) and excessively low prices of agricultural produce (0.705). It defines the barriers to organic food processing. The last component loads two factors: an inclination towards conventionally produced food (0.799) and low consumer awareness (0.737). It identifies barriers resulting from conventional consumer attitudes.

Barriers to market development, according to distributors

In 2019, in the opinion of distributors, the most significant barriers to the sales of organic products included the high price of organic products (mean score of 5.68), customers' inclination towards conventionally produced food (4.63) and the lack of adequate support from the state (4.41). In 2021, the most significant sales barriers included excessively high costs of organic production (mean score 5.02), bureaucratic and administrative difficulties for organic farms (5.00) and the lack of adequate state support for organic farming (4.90). The results of the exploratory factor analysis for barriers to development according to organic distributors are presented in Table 3.

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Table 3. Factor loadings of components[1] were obtained using the principal component analysis with Varimax rotation with Kaiser normalisation. Barriers to sales of organic farming products, according to distributors in 2019 and 2021

Factor	Barriers to the sales of organic farming products 2019	Loading	Factor	Barriers to the production development and increased sales 2021	Loading
1	Insufficient consumer awareness of environmental issues	0.859	1	Bureaucratic and administrative difficulties faced by organic farms	0.878
	Customer inclination towards conventionally produced food	0.711		Lack of adequate state support for organic farming	0.731
	Underdeveloped distribution network	0.648			
2	Low awareness of organic farming certification	0.833	2	Difficulties in applying organic farming methods on farms	0.871
	Insufficient information about the offer	0.785		Excessively high costs of organic production	0.795
3	Lack of adequate state support	0.870	3	Little opportunity to sell organic products (too little demand)	0.844
	Lack of confidence in the ability to solve global environmental issues	0.747		Low profitability of organic farming	0.682
4	Unavailability of some products	0.875	4	Excessive high prices of organic food making consumers discouraged	0.867
	High prices of organic products	0.621		Insufficient environmental awareness of consumers	0.668
				Customer inclination towards conventionally produced food	0.517

Notes: [1] The rotation reached convergence in 6 iterations (2019) and 5 iterations (2021).
Source: own calculations in IBM SPSS Statistics 28.0.

The four components extracted in 2019 explain, respectively: 23.0%, 17.6%, 16.6%, and 14.2% of the common variance. The first common factor is formed by the following: insufficient consumer awareness of environmental issues, inclination towards conventionally produced food, and an underdeveloped distribution network. These factors determine consumer awareness and attitudes towards environmental issues. The second component, comprising two factors with high loadings, identifies (insufficient) knowledge and information regarding organic agricultural products. The third common factor describes the difficulties in obtaining external financial aid as

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well as organisational and legal support for environmental activities. The fourth component, loading two factors (one with a high loading), identifies access to organic products.

In 2021, the shares of variance of the four components were similar: 18.7%, 18.5%, 18.5%, and 17.7%. The first common factor comprises bureaucratic and administrative difficulties (0.878) and the lack of state support (0.731). It relates to organisational and legal barriers.

The second component is loaded by the following: difficulties in applying organic farming methods and high production costs. It identifies a barrier resulting from the specific character of organic farming. The third common factor takes into account two variables, one of which (too little demand) has a strong correlation with the component. It is referred to as the demand income factor. The fourth component, loading three factors (with "excessively high prices of organic food" having a high loading), reflects traditional consumer attitudes.

Barriers to the development of organic production according to consumers

The 2021 survey of consumers regarding barriers to the development of the sales of organic farming products reveals that the main barriers include the high price (mean score of 5.52), insufficient consumer awareness of environmental matters (4.86), the lack of adequate state support (4.80), insufficient information about the offer (4.78), and unavailability of some products (4.76). The results of the exploratory factor analysis regarding barriers to the development of sales of organic products (Table 4) show that the first common factor (formed by four variables) is the leading factor for explaining the common variance (27.0%). It determines barriers to the availability of organic products. The second component, comprising two factors (21.3% of the variance), describes the difficulties in obtaining external organisational and legal support. The third common factor, related to the two variables, reflects barriers resulting from the underestimation of the role of environmental matters. It explains 17.1% of the variance.

The fourth component, identifying the price barriers to organic products, takes into account one variable with a high loading (0.846). It explains 12.5% of the common variance.

The 2009 consumer survey regarding barriers to the development of sales of organic products revealed three barriers: high price (26%), habits and customs (18%), and poor distribution network (14%) (Figure 3).

DOI: 10.34659/eis.2023.84.1.547

Table 4. Factor loadings of components[1] were obtained using the principal component analysis with Varimax rotation with Kaiser normalisation. Barriers to the development of sales of organic farming products according to consumers in 2021 (N = 1032)

Factor	Barrier	Loading
1	Unavailability of some products	0.782
	Insufficient information about the offer	0.689
	Underdeveloped distribution network	0.620
	Low awareness of certification	0.604
2	Lack of adequate state support	0.828
	Insufficient consumer awareness of environmental issues	0.671
3	Lack of confidence in the ability to solve global environmental issues	0.832
	Customer inclination towards conventionally produced goods	0.604
4	High prices of products	0.846

Notes: [1] The rotation reached convergence in 9 iterations.
Source: own calculations using IBM SPSS Statistics 28.0.

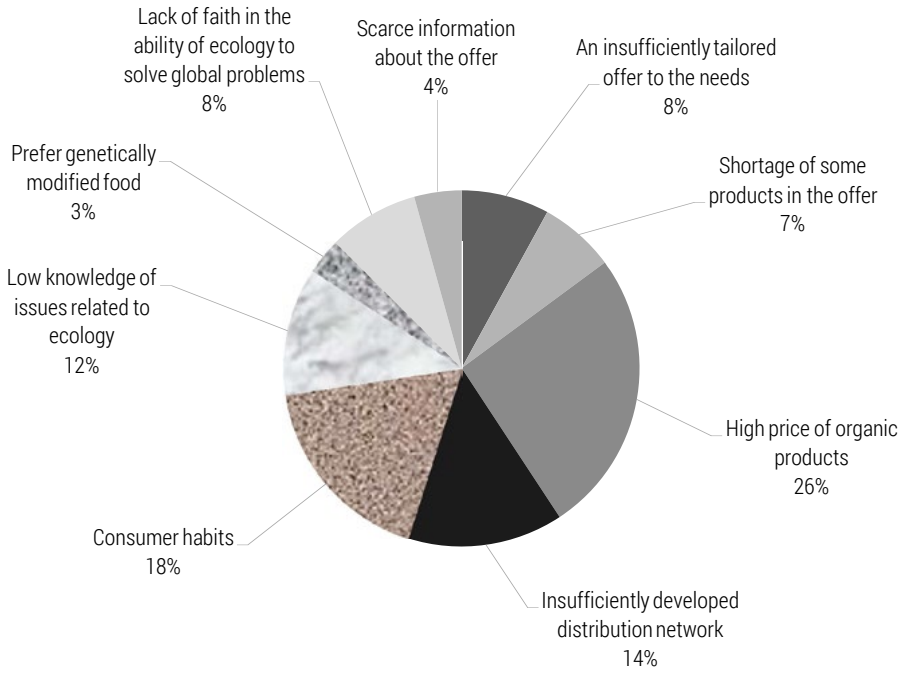

Figure 3. Barriers to organic food purchases in 2009 – distribution of consumer responses.
Source: own calculations in IBM SPSS Statistics 28.0.

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Discussion and conclusions

The results of farmer surveys show that the factor considered to be the greatest opportunity for market development ("environmental awareness of consumers") gained importance between 2011 and 2019. This factor has also become more popular among organic farmers over time. Organic farmers considered it the greatest opportunity for development in all three survey stages. In 2021 and 2019, they tended to choose this response more frequently than in 2011 (however, in 2021, the percentage was slightly lower than in 2019). Between 2011 and 2019, growing demand and environmentally friendly consumer behaviour were factors becoming more popular among organic farmers. These factors were ranked second and third in terms of the frequency of responses. However, in 2021, fewer respondents (by more than 5 percentage points) recognised them as opportunities. This may indicate that farmers find it more difficult than before to reach end customers. EU subsidies are also in decline due to the way Polish organisations involved in paying subsidies operate. In 2011, 16.4% of organic farmers identified friendly state policy as an opportunity for development, which was the third most frequently chosen factor. In 2019, this factor was in last place (5.4%)[1]. This decline may indicate the negative impact of the agricultural policy of Polish institutions on the development of organic farming. The incoherent and chaotic policy was one of the key reasons for the decline in the number of organic farms and acreage since 2013, as presented in the introduction (Kociszewski, 2022). This is also confirmed by the report of the Supreme Chamber of Control (NIK, 2019). According to the survey results, in 2021, significantly more farmers, compared to 2019, indicated the state policy as an opportunity for development (Figure 1). This may mean that farmers who have not abandoned organic production have had to adapt to the functioning of the subsidy system in recent years, which may have affected their opinion.

The results of the factor analysis based on the 2021 organic farmer survey (Table 1) shows that the institutional dimension of the development of organic farming (35.6% of the common variance) is the key component of development opportunities out of the three identified. This mainly refers to the cooperation between actors involved in the organic food market (both among farmers and between farmers and distributors). The variables associated with this cooperation had high factor loadings indicating a strong association with the common factor. "Relevant policy of Polish state institutions supporting organic farms" and "EU subsidies" had lower factor loadings,

[1] In the section containing part of the 2019 organic farmer survey results (Kociszewski, 2022), the percentages were higher due to the use of a different point of reference for calculation (i.e. the number of respondents and not the number of total responses).

DOI: 10.34659/eis.2023.84.1.547

implying a weaker association. The second component extracted regarding development opportunities reflects environmentally friendly consumer behaviour. The survey results (23.3% of the common variance) show that organic farmers find it less important for the development of this segment than institutional aspects (35.6%). They correspond well with the previously discussed decline in the assessment of environmentally friendly consumer behaviour in relation to 2019. The results may be due to a limited flow of demand impulses from consumers to farmers. Consumers buy increasingly more organic food, but much of it is imported. This is also related to the result obtained for the third component, i.e. organic food quality (13.8% of the variance). Of all three components, it is least important for market development. "Better distribution" is one of the variables of this component (0.637). It does not provide an effective link between the supply of Polish organic agricultural produce and the final consumer so far.

According to the 2019 and 2021 distributor surveys, the biggest opportunities for the development of organic farming lie in demand factors related to environmentally friendly consumer attitudes. These factors (as variables) load the component "environmentally friendly consumer behaviour" in the factor analysis (Table 1). The importance of these factors as development opportunities increased in 2021 compared to 2019. The assessment of factors related to the relationships between actors involved in the links of the organic food supply chain (including between distributors and farmers) declined – the component "conditions for the functioning of distributors and farmers on the market" (21.1% of the common variance in 2019 and 18.7% in 2021). Vendors perceive a growing demand for organic food, but, as previously indicated, they meet the demand to a limited extent using final goods from Polish agricultural produce. One of the reasons for this is the weakness of relationships between key actors in the organic food supply chain.

In the opinion of all farmers, the key obstacle to the development of organic farming is bureaucratic difficulties (Figure 2). This confirms the negative impact of the way Polish organisations associated with farm support policies operate, as previously demonstrated. The literature also addresses these aspects (Komorowska, 2013; Brodzińska, 2014; Nachtman, 2015; Gil, 2016). The importance of these factors increased between 2011 and 2019. Weak distribution and promotion system is the second barrier. This corresponds with the unfavourable assessment of relationships between farmers and vendors as a development opportunity. This is also evident from the opinions of organic farmers. Again, there is a correspondence with the findings of other authors (Łuczka, 2016a; Smoluk-Sikorska et al., 2017). Factors limiting the profitability of production (excessively high production costs and low yields) were also considered increasingly significant barriers by organic farmers. This may lead to the conclusion that it would be advisable to

DOI: 10.34659/eis.2023.84.1.547

increase the compensating subsidy rates for organic farms. The policy of Polish organisations involved in the distribution of payments to farms should also be sorted out and stabilised. The policy should shape a predictable support framework allowing for medium to long-term planning of organic product development. Organic farmers considered traditional consumer attitudes as the least important barrier to development. This corresponds with the results for environmental awareness of opportunities for market development and environmentally friendly consumer attitudes.

The results of the survey of organic food distributors for obstacles to market development show that they perceive legal and organisational constraints related to the domestic agricultural policy as an increasing difficulty and see consumer attitudes related to consumer inclination towards conventionally produced food as a lower barrier. High prices and the associated high costs of production are still strong barriers. However, note that some authors conclude that the factor that hinders the development of the market is the high margins charged by intermediaries (Grzybowska-Brzezińska & Gorlowa, 2019; Smoluk-Sikorska, 2017).

There is correspondence between distributors and farmers as regards changes in their assessments of barriers. Similar conclusions can be drawn from the factor analysis. The 2019 results show that consumer awareness and attitudes towards environmental issues (23.0% of the common variance) and insufficient knowledge and information on organic agricultural products (17.6%) were key barriers to development; out of the four components identified the component defining external financial as well as organisational and legal support for organic activities and access to organic products was slightly less significant (16.6% and 14.2% respectively). In 2021, legal and organisational constraints, a factor associated with the policy of state organisations, proved to be the most significant barrier (18.7%). Distributors regarded barriers arising from the specific character of organic farming, including high costs of production, as more important than in the previous survey (18.5%). Demand aspects related to consumer attitudes lost importance as a barrier to market development (third and fourth components, 18.5% and 17.7%, respectively). However, note that different specifications and types of barriers to development led to different common factors (different types and structures of common factors). The product knowledge factor, identified in 2019, had no counterpart in 2021, and the demand-income factor, identified in 2021, had no similar counterpart in 2019. The high price factor (high prices of organic products in 2019, excessively high prices of organic food products in 2021) reflected access to organic products in 2019 and traditional consumer attitudes in 2021.

To summarise the analysis of the demand side of the market, the factors that allow a greater correspondence between consumer-declared attitudes

DOI: 10.34659/eis.2023.84.1.547

towards organic food and their purchasing behaviour on the organic food market should be emphasised, i.e. knowledge and environmental orientation of consumers. Significant interaction effects between these factors are also evident. This means that consumers with an environmental orientation will tend to express more consistent attitudes and purchase behaviour if they know more about organic food, as opposed to consumers with a health or hedonic orientation (Hidalgo-Baz et al., 2017).

Therefore, efforts are needed to raise public awareness of organic food through various forms of education provided by organic food industry companies and associations and governmental actors. In particular, the relevant knowledge should be actively distributed and popularised using all communication channels, especially via the Internet and social media, as well as television, newspapers, and other media channels. Adapting the messages to the channels used and customer segment facilitates the promotion and public understanding of the advantages of organic food over conventional food.

Furthermore, in order to encourage consumers to choose organic products, companies should communicate with consumers by demonstrating more clearly utilitarian and hedonic benefits from the products and, more importantly, core ethical values. Consumer confidence in organic products should also be increased. This requires not only the dissemination of knowledge on food safety but also more exposed organic labels and high-quality food labels. Greater recognition of the labels will translate into more frequently chosen organic food and increased purchasing.

Therefore, companies that want to differentiate their offerings and achieve a competitive advantage based on their organic products must invest in certifications, environmentally friendly technologies and packaging, clear product labels, and credible spokespeople. Furthermore, they should take care to provide consistent messages about their commitment to sustainability (Connelly et al., 2011). The image of an organic food company also plays an important role in shaping consumer behaviour. Research shows that an image based on corporate social responsibility principles has a positive impact on consumer behaviour, particularly in the organic food market (Weiping et al., 2021), enhancing consumer confidence in companies and their products.

An effective form of communication to increase the company's credibility in the eyes of customers and shorten the distance between consumers and organic food producers is to take additional special activities, including organising events that allow consumers to visit production facilities and learn about the production process of the food and launching ecotourism programmes, especially in large production enterprises, to promote organic food (Liu & Zheng, 2019). Furthermore, enterprises, in cooperation with organic food industry associations and local government bodies, should

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undertake other projects, such as organic food promotion programmes and regular organic food fairs to increase the availability of organic food and raise environmental awareness among the public.

Referring to price as a barrier to the consumption of organic food, the high price image should be mitigated by, among others, clearly identifying the features that distinguish organic products from conventional food (Aschemann-Witzel & Aagaard, 2014). In addition, producers should make efforts to improve the cost-to-value ratio. To this end, they should shape consumer perceived value, improve product quality, and lower organic costs (Baum, 2018).

The factor of organic food availability deserves special attention. While Polish consumers perceive positive changes regarding the availability of organic food, this is not the case for all product groups. The support from governmental bodies and other institutions, including the Agency for Restructuring and Modernisation of Agriculture, for the diversification of distribution channels, as expected by consumers, especially in relation to direct sales, is also needed (Nestorowicz et al., 2019). Supporting short distribution chains for organic food is a response to the needs of organic food consumers, who often prefer to buy food directly from organic farmers.

Also, note that Internet technology plays a significant role in overcoming the barrier to food accessibility. Polish consumers surveyed bought organic food most often in supermarkets (24.1% of responses), hypermarkets (17.9%), and small neighbourhood shops (14.7%). However, due to the trend of Internet sales of organic products observed in the world, which, due to the COVID-19 pandemic, has increased significantly over the past two years, the sale of organic food in Internet shops is expected to increase in Poland as well. This will make organic food more accessible to different groups of consumers.

Finally, the need to break the Poles' consumption habits and customs should be emphasised. This requires a profound cultural transformation of society based on the implementation of the idea of the environmental perception of the world. The transformation is already underway but concerns only more educated, better-off groups of society who appreciate the health and environmental benefits of organic products. Therefore, integrating countries into the so-called green revolution requires launching environmental projects, also implemented by market actors, at different levels of education, from primary education through the subsequent levels. Most of the challenges for further development identified in the paper, both on the demand and supply side, correspond with those identified in the Framework Action Plan for Organic Food and Farming in Poland for 2021–2027 (Ministerstwo Rolnictwa i Rozwoju Wsi, 2021) and with the list of challenges from the

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report "Organic Food in Poland. Report 2021" (Koalicja na rzecz BIO & NielsenIQ, 2021).

The assessment of factors affecting the future development of the organic food market should involve new aspects influencing market development, including the increase in energy costs (which will increase the price of fertilisers and the transport of conventional food), the disruption of food supply chains, the impoverishment of consumers forcing a change in the consumption profile (especially the reduction of the supply of cereals), and the production of meat products, highly processed goods, and imported goods. These aspects seem to be an opportunity for the development of organic farming, the development of producer groups, the development of local distribution and sales networks and, consequently, a change in the food consumption profile towards organic agricultural products produced locally and adapted to changing consumer preferences.

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The contribution of the authors

The article is a collaboration between the authors without specifying the detailed contribution of each.

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