

Article

# Dynamic Development of the Global Organic Food Market and Opportunities for Ukraine

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**Abstract:** Considering the insufficient usage of natural resources, ecological crisis, rising population and limitations of the traditional food system in the 21st century, it is extremely important to search for methods to achieve sustainable development. In this context, the search for alternative methods of farming and the transformation of typical food consumption is relevant; the organic market and its features are of particular interest. Based on the above, this article is dedicated to understanding what the development opportunities for the production and export of Ukrainian organic products within the global market are. To achieve this objective, it became necessary to study the specificities of the dynamic growth of the global organic food market, which includes identifying the dominant factors of its development, peculiarities of its regulation, evaluation of the current state, main trends and prospects. The study provides the characteristics of the top competitors in the global market, consumer segmentation and experience of the implementation of global and national organic sector development and support programs. As a result of the study, it was found that Ukraine has unrealized export potential that can be realized using a combination of practices used abroad (the active use of marketing tools, state support for the organic sector and increasing organic production by uniting producers into clusters and creating cooperatives).

**Keywords:** global organic food market; international trade; trade agreements; development programs; marketing strategies; export-oriented model

## 1. Introduction

Since the emergence of organic products, we are witnessing the formation of a new market, which, in the future, due to favorable economic, social and technological factors, will lead to the emergence of a global organic food market. Development of the organic food market involves many benefits for manufacturers since organic production provides high income for commodity producers on the one hand and sustainable development on the other. Sustainable development consists of two major components, economic and social; therefore, the economic component is the core of the sustainable

development concept, whereas the social and ecological ones are playing a supporting role. Thus, we are witnessing a new version of the term “the productive capacity of a country”, which states that long-term projects implemented accounting for nature and social patterns prove to be economically effective [1]. There is a strong interconnection between the productive capacity of the organic sector and the implementation of the Sustainable Development Goals [2,3]. Growth and development quite often come into dialectic conflict in the sustainable development concept. The principal dimension distinguishing between the two notions is the difference in goals sought by the processes involved in them, either through decision-making mechanisms or in a chaotic manner. While the goal of socioeconomic development is productivity growth, the development of productive forces and the improvement of the quality of human life, the strategy of economic growth is focused on output growth only for the sake of GDP growth, having short-term effects and negative implications for the social, cultural and ecological situation. Therefore, the socioeconomic development of organic farming, but not the economic growth of traditional agriculture, can ensure sustainability, coherence and balance.

Several works of scientists such as Antonets [4], Lupenko [5], Podolynskiy [6] and Rudnytska [7] are dedicated to the issue of organic production and its impressive phenomenon of spreading and highlighting the growing demand and export opportunities for different countries, including Ukraine. The issues of the economic efficiency of organic farming are noted in the scientific works of Dudar [8], Padel [9], Fedorov et al. [10], etc. The formation of the organic food market was considered by Boyko [11], Kozlova [12], Yatsenko et al. [13–15], Mazurova [16], Zavadzka [17], etc. A few works of such scientists as Bek [18], Bilorus et al. [19,20], Vlasov [21], Maistro [22], Pakhomov et al. [23], Sabluk et al. [24], Sokolenko [25,26], Held [27], etc. are dedicated to the problem of the transformation of market relations due to economic globalization, gaining competitive and comparative advantages in the global organic food market and perspectives and opportunities for Ukraine. Yet the conformity between commercial benefits related to gaining competitive and comparative advantages in the organic food market and enhancing its adaptability in implementing the Sustainable Development Goals remains uncertain. This calls for finding a compromise so that medium and large businesses have to focus not only on profitability but on effective utilization of resources.

The typical sign of the world’s economic globalization is an asymmetric development of its elements conditioned by the difference in potentials. Therefore, to facilitate global development, countries should size up external economic potential with a strategic orientation at competitive export products [3].

In the scientific literature, we can come across different definitions of organic production, but most of them do not deliver a compilation of organic products in the global market. Therefore, the International Federation of Organic Agriculture Movements (IFOAM), as the major advocate of organic production, has developed its own definition for organic agriculture, according to which it is a production system that sustains the health of soils, ecosystems and people. It is adapted to local conditions; combines tradition, innovation and science; and promotes fair relationships and a good quality of life for all involved [2]. According to the United States Department of Agriculture, National Organic Standards Board (NOSB), organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony [28,29]. Despite a large number of definitions of organic production, there is no clear definition of what the market for organic products is. According to the Law of Ukraine “On the Basic principles and requirements for organic production, circulation and labeling of organic products” (6 June 2019) [30], the organic food market is an economic entity that creates appropriate conditions for the sale (wholesale sale) of agricultural products, including food products, in specially equipped and designated places in accordance with the law. Researchers such as Pavlenko et al. [31] see the organic food market as a system of economic relations that are formed in the process of production, exchange and consumption of agricultural raw materials and food. The interpretation of the term

“organic food market” by Churin [32] is somewhat supplemented, which characterizes it as a multilevel, multipurpose and multifunctional system in which different sectors of production and consumption as well as their subjects have their own characteristics and conflicting interests. However, none of the mentioned scientists took into account the global aspect and the particularity of the specifics of trading organic products, specifically certification, especially in the context of the differences in requirements. Thus, the authors define the global organic food market as a mechanism of balancing the global demand and global supply of organic food with binary standardization: the objective marketing one as a result of demand homogeneity and the imperative legal one as a condition for entering the international trade exchange.

Thereby, the development of the organic sector and the market for organic products is in line with the Sustainable Development Goals. In this context, the main goal of our scientific work is theoretical and practical research on the peculiarities of the global organic food market and identifying opportunities for Ukraine. In order to achieve this goal, in the first section of the article, the authors identify the dominant factors of the formation and structuring of the global organic food market and the parameters for the identification of organic products. The second section analyzes the current state and trends of the global market for these products and summarizes the experience of creating and implementing global and national programs for the development of organic sectors at the global, regional and local levels. In the third section, the state of development of the market for organic products is analyzed, and the national priorities and scenarios of development of the market for organic products in Ukraine are substantiated.

## 2. Theoretical Basis of Formation and Structuring of the Global Organic Food Market

### 2.1. Formation of the Global Organic Food Market

In its formation, the global organic food market has had a unique way of establishment, which can be divided into four stages. The first stage (18th–20th centuries) was characterized by the formation of the “ecological awareness” basics. Furthermore, with the emergence of the idea of organic production and the organic farming movement in European countries, the USA and Japan (1920–1946, stage two), a concept of organic production was formed. As organic production began to attract more and more farmers, demand grew, and infrastructure was formed. At this stage (1946–1990, stage three), we witnessed the first system of organic food certification being developed, the emergence of the organic sector and growth of demand for organic food in the 1960s and 1970s, the foundation of international organic organizations such as IFOAM in 1972 and Research Institute of Organic Agriculture (FiBL) in 1973 and the development of organic standards and a legal basis for organic production by the world’s countries. As a result, the global organic food market began to form (1990–today, stage four) due to the implementation of a legal basis for the production and trade of organic food in the USA, EU countries, Australia, Japan, etc.; the development of state programs for organic production support; a dynamic increase in the number of organic farms, importers and exporters of organic produce; the appearance of organic assortments in traditional channels of distribution and the foundation of trade chains’ own organic trademarks; the appearance of organic agrarian cooperatives, associations and clusters; the intensification of the international organic food trade (over 180 countries); the increase in the number of organic standards (over 80 types); the widening and diversification of organic food assortments (appearance of new segments); the dynamic growth of the global organic food market (\$97 billion); international trade based on equivalent agreements; the activation of mergers and takeovers in the organic sector; the digitalization of organic businesses (transparency creation); the appearance of organic services (delivery systems, agribusiness); and the introduction of organic production courses in educational institutions [33–35].

## 2.2. Product Approach of the Global Organic Food Market

The global organic food market must be reasonably structured within the product, geographical and object approaches. Using the product approach, the market is divided into the following goods groups: live animals; animal-source products; plant-source products; fats and oils of animal- and plant-source products; products of their splitting; ready food fats; waxes of plant- or animal-source products; alcohol, nonalcoholic drinks and vinegar; and tobacco and its substitutes. According to the object approach, it is necessary to specify the following markets: the raw agricultural products and produce market and processed produce market. Market structuring according to the geographical approach is conducted with arbitrary criteria (countries, separate continents, etc.). A complex investigation of modern transformations in the organic sector lets us single out dominant factors that appear to be its development catalysts: postindustrialization; production and trade digitalization (active use of the latest technologies (GPS, Global Navigation Satellite System, the Internet of things, robots and blockchain technology)); the implementation of alternative methods in agriculture (hydroponics, aquaponics and vertical farming); the modernization of professions and educational methods (the appearance of “jobs of the future”, e.g., a “rewilder”, a new type of a farmer whose job is to minimize negative influences on the environment; agroecologists; fish and urban farmers; and the introduction of organic produce courses in educational institutions); the ecologization of the international economy (green entrepreneurship and sustainable consumption); agribusiness functional diversification (the “bioeconomy” phenomenon); the dynamization of e-commerce and transformation of business subject interaction (B2B, B2G, B2C, C2C, G2B and C2G); produce customization; and the appearance of a new type of consumer—the “digital consumer”. It must be mentioned that the outcome of the postindustrial market’s appearance was the aggravation of ecological and food crises due to overuse and inefficient use of resources and galloping and asymmetric economic development of countries [36–39].

Since one of the significant peculiarities of the global food market is the circulation of a wide range of ecological produce, it is reasonable to consider the identification parameters of organic agriculture, which include the use of ecology protection technologies for production with principles of organic farming; maintaining crop rotation; the production and processing of agricultural raw materials while meeting regulating organic standards; compliance with certification demands at all stages of bringing organic products to end users, including processing, storing, packaging, transportation, promotion and sale; and the availability of organic certificates and product labeling. There is a large number of motivating factors for organic agriculture, which include the economic (spreading of the “fair international trade” notion, creating extra jobs and an increase in production profitability), ecological (restoration of ecosystems and minimization of negative anthropological influences on the environment), social (a decrease in poverty levels and providing mental, physical, ecological and social well-being) and marketing groups (presence of dynamically growing global segments of organic produce consumption, inelasticity of demand, etc.).

## 2.3. Ecoinnovation in the Organic Sector by Groups

The organic food production process and its products in the end are a part of a specific innovation group whose basis lies in the ecological aspect (ecoinnovations). It is determined by the principles of environmental protection and providing the population with quality and safe products, which builds the core of organic production. Conventionally, the method of organic production comprises two significant directions—ecological and social [40,41]; organic production pursues the same goals as the strategy of sustainable development. Innovations are a considerable part of organic market development in the world’s countries; thus, they may be divided into the following groups: organizational form, production, packaging, transportation and marketing (Table 1).

**Table 1.** Ecoinnovations in the organic sector by groups.

Group	Example	Description
Organizational form	Creating cooperatives and clusters	Since major producers of organic food are small and medium enterprises (farms), uniting into cooperatives and creating clusters let them freely exchange innovations and experience, increase their export power and establish close contact among all participants in the organic market.
	Collecting and analyzing data	This is a vital component for efficient and profitable production; thus, using specifically designed software promotes collecting and analyzing a great scope of data whose assessment lets organic food producers make more weighed decisions about production.
Production	Technologies for organic weed reduction	Since the organic method of production requires bigger labor costs, which lead to an increase in organic food prices, there is a necessity to constantly search for new methods of growing process improvement and organic food production. Organic food producers regularly implement technologies such as cultivators for inter-row soil cultivation, mechanical weed reduction, etc.
	Technologies for accurate sowing	These are used in order to optimize harvests on the basis of received data and conditions.
	Internet of things (IoT)	The technology provides farmers with the data necessary for designing efficient planting schedules, which will further lead to crop capacity increases; improvements in produce quality; and decreases in exploitation costs, growing time and the use of energy.
Sustainable packaging	Zero-waste packaging	Packaging is an important part of organic goods, especially provided that goods demand is growing in the market. Since organic production is linked to ecological issues, packaging (plastic) makes consumers concerned. Therefore, many organic food producers are constantly searching for innovation in packaging. A zero-waste direction (that is, the complete renunciation of using plastic as a packaging material) is becoming increasingly popular among organic producers. Additionally, product descriptions and labeling are essential parts of packaging since they provide accurate and actual information to consumers (peculiarities of labeling usage are provided in regulatory documents that directly suggest rules of production, transportation, etc. of organic food and vary depending on the chosen standard system).
	Blockchain	Using blockchain encourages the creation of a transparent system of goods itineraries that considerably increases consumers' trust in products. Thus, the British Soil Association in cooperation with technology start-up Provenance developed a pilot technology that will enable consumers who possess Near-Field-Communication smartphones to receive the necessary information about organic food. In addition to food chain transparency assistance, the use of blockchain by food/industrial groups for facilitation of the direct sales process is a perspective; consumers can also save up to 30% on daily purchasing by buying directly from food producers. Food industry leaders, such as Walmart, Nestlé, Unilever and others in cooperation with IBM are actively implementing blockchain technology in order to support digital data protection and the promotion of food tracking (e.g., chicken, chocolate and bananas).
	Zero miles	The "zero miles" initiative and "100% produce" of local production have become widespread in Spain. The Casa Grande de Xanceda milk company, which produces organic yogurt, is a good example of their efficient implementation. The company has signed priority deals with local suppliers not only on produce delivery but also dealing with issues of farm maintenance and animals' well-being.
	U-pick	Organic farms all over the world offer a service of organic food being collected by consumers.
Marketing	Green marketing	Despite the fact that organic food production has positive effects on the environment, the system of food delivery from producers to consumers is still an issue. Thus, organic companies resort to using such tools of green marketing as creating local points of sale where local consumers buy foods, thus reducing CO <sub>2</sub> emissions into the atmosphere when transporting food from point A to point B. American company Buddha Teas, which sells various organic tea blends, is a good example of implementing "green" marketing. The company uses materials that have minimal negative effects on the environment and either decompose naturally or can be recycled for packaging production.

Source: own elaboration based on information from references [42–47].

Regulation of the organic food market is realized on all levels, including by intergovernmental and nongovernmental organizations and global and national institutes. The development of certification rules for this produce and monitoring the state of organic legislation implementation by countries at the global level is carried out by the Food and Agriculture Organization of the United Nations (FAO), the International Federation of Organic Agriculture Movements (IFOAM) and others. The peculiarities of organic production are the strictly regulated conditions and rules of the production process; compliance with them is proved with production certification. Taking into account a big number of organic standards for this produce in the global market, one of the auxiliary tools is international equivalence agreements, whose aim is to simplify the organic food trade among countries using their offsetting.

### 3. Transformation of the Global Organic Food Market

#### 3.1. Main Trends in the Development of Organic Food Markets in World Regions and Continents

It is important to mention that 181 countries are participants in the international organic food trade, and the market is worth \$97 billion (2017). Over 80% of organic food producers are concentrated in Asia (40%), Africa (28%) and Latin America (16%). The largest organic food markets include the USA (43%), Germany (11%), France (9%) and China (8%). North America and European countries cover 90% of worldwide sales of organic food and drinks in retail channels; however, the role of exporting countries in Asia, Africa and Latin America is growing. The list of the top five organic food exporters includes the USA, Italy, the Netherlands, China and Spain; importing countries include the USA, France, Spain, Turkey and Canada. The most popular goods categories within the goods structure are fresh vegetables, fruits and crops; the fraction of ready goods is increasing [48]. Since in some countries, organic markets are more developed, they often dictate the development trends of other organic markets; therefore, in order to get a complete picture of the development features of the global organic market, common tendencies of organic food market development in particular countries and regions have been identified in Table 2.

**Table 2.** Trends in the development of organic food markets in regions.

Specifics	Region					
	North America	Europe	Asia	Latin America	Oceania	Africa
1. Online trade development	+	+	+	-	-	-
2. Promotion of organic food by large retailers using own brands	+	+	+	-	-	-
3. Increase in alternative produce segment demand	+	+	-	-	+	-
4. Organic movement development	+	+	+	+	-	+
5. Vegetarian and vegan lifestyle popularization	+	+	+	-	+	-
6. Extension of food niche	+	+	+	+	+	-
7. State support of organic production development	+	+	+	+	+	-
8. Availability of regulatory base for market regulating and product certification	+	+	+	-	+	+
9. Implementation of organic production courses in educational institutions	+	+	-	-	-	-
10. Production system transparency	+	+	-	-	-	-
11. Local production development	+	+	+	+	+	-

Note: + the tendency is present; - the tendency is absent. Source: own elaboration based on information from references [2,49].

So far, world organic markets are at different stages of development, which is linked to various development levels, a legal regulatory base of organic food production and organic sector development programs, a number of trade and processing companies, the presence of a diversified assortment of organic food, infrastructure development and the presence of solvent demand and large retailers that use aggressive marketing to popularize organic food. According to these characteristics, the markets of the USA, Germany, France, Italy and Denmark are close to the maturity stage; the markets of Spain, India, China, Australia and others are promptly developing; and other markets are being established.

Based on the specifics of organic market development, there are two groups: driving countries (countries of North America and the EU and China) and outsiders—African countries (Table 3).

**Table 3.** Specifics of development of organic food markets.

Countries	Specifics
The USA	Tough competition in the market; developed institutional structure; generator of new tendencies in the global organic food market, which are promptly adopted by organic food consumers from other countries; 75% of organic food is exported to USMCA countries (Canada and Mexico); setting direct connections between large chain resellers and small and medium organic producers, creating collaborations that lead to exclusion of all resellers by creating own supply systems.
Germany	Favorable economic environment; imports of a large quantity of organic food from EU countries since demand considerably exceeds supply; developed European regional and national chain of supermarkets and organic shops, which have relatively big assortments of organic food.
France	Demand satisfaction of 70% due to own production, with the other 30% covered by imports from European countries; considerable price difference between organic and traditional goods, at 79%.
Italy	Fragmented and competitive market; about 5% of food exports of Italy are organic food; major trade partners of Italy are Germany, France, the Benelux countries, Scandinavian countries and the USA; active organic food consumers of Italy are educational establishments; Italian organic sector mainly produces plant-source products.
Spain	Organic sector of Spain is export-oriented, mainly towards Central European countries; 80% of Spanish products are imported by Germany, France and Great Britain; so-called “sustainable restaurants” are widespread in Spain; they prefer local organic food suppliers.
China	Export-oriented development direction of Chinese organic sector; countries that import organic food from China are the USA, European countries, Japan and others; over 80% of domestic market is controlled by hypermarkets and specialized shops; the growth of solvent population forms demand for ecologically safe food; the world e-commerce development driver.
India	Concentration of the largest number of organic producers; major countries importing organic food from India are the USA, Canada, Switzerland and Israel; annual growth of Indian organic food market is at 20%–30%; considerable development potential if domestic issues are solved: creating transparent certification process, strengthening national brands’ role in the international market and state support of national producers; has the first 100% organic city.
Latin American countries	Important regional organic food supplier; the biggest quantities of organic land are located in Argentina, Brazil and Uruguay; 80% to 90% of produce is exported to the EU, the USA (about 70% of organic food imported to the USA is from Latin America) and Japan; exports cover a wide range of food, including bananas and coffee beans from Central America, Paraguayan and Brazilian sugar as well as Argentinean meat.
African countries	The largest quantity of organic areas, favorable climate and a lot of water bodies; organic food is mainly exported.

Source: own elaboration [48–50].

From a global perspective, the markets that have considerable development potential and a dominating influence on the formation of particular tendencies, particularly the organic food market in China, deserve special attention. The organic food market occupies the world's fourth position in retail sales volumes, exporting over \$500 million of organic food. Specific peculiarities of Chinese food market development are distrust of national organic producers and the certification process (only 30% of produce is certified by the Chinese organic certification center), an increase in the middle class fraction (81% are households whose income is over \$24,000, and major consumers are millennials), the presence of state support programs and the domination of online trade, and over 70% of organic food is imported.

Stimulation of Chinese market development takes place at the expense of maintaining cooperation agreements in organic production. China signed the COFCC–IMOcert Cooperation Agreement on Organic Products with the IMOcert certification organization in Latin America [51] and an agreement on cooperation with Denmark for 2017–2019. Using common accreditation, organic food exchange between the countries increased, and China had access to the European market through Denmark [52]. Denmark is a European Union member and an important Belt and Road junction.

It is important to state that a major driver of global market development is a specific consumer group with a clearly shaped proecological orientation presented mostly by millennials (aged 25–35) who have high education and an average (above-average) income level [53–55]. There are several classifications of organic consumers based on different criteria. Thus, according to Bartelsom and Van den Bergom [56], consumers of organic agrifood products, depending on the frequency of their organic purchases, can be divided into three groups: anticonsumers (“nonusers” who do not buy organic at all), moderate “light users” and pro-organic “heavy users” (who prefer organic products)—the study characterized organic consumers in Denmark. Zakovska-Biemans [57] classified consumers, according to their consumer preferences and lifestyle, into five main groups: the disinterested or “uncommitted”, “traditionalists”, the apathetic or “careless”, the “conscious” and pragmatic “pragmatists”, typically, for Poland in particular. Diaz et al. [58] distributed consumers according to their level of awareness and consumption of organic products: anticonsumers or “nonconsumers”, ordinary “habitual” and periodic “occasional” consumers (who buy organic products sometimes) in Spain. According to the authors, organic food consumers may be classified according to the following criteria: attitude to organic production (conservative, adherent or pro-organic consumers), loyalty (to a brand or an organic certificate), motives (environmental protectionists, organic followers and skeptics) and lifestyle (conscientious and apathetic).

Major world organic food market leaders (General Mills, Whole Foods Market (Amazon), Danone, Hain Celestial Group, United Natural Foods, Newman's Own, Aldi Einkauf and Co hogs and REWE Markt) [59–65] have been identified in the article, and their activity has been analyzed based on three indices: regional presence, product portfolio and presenting products on the web. Accordingly, the companies have been divided into four groups: leaders able to satisfy increasing demand in the world, which are large producers/retailers with a package of various products allowing them to satisfy branch needs (General Mills, Whole Foods Market, Hain Celestial Group and Newman's Own); long-sighted players, who calculate potential market development directions or timely foresee market rule changes (Danone and United Natural Foods); niche players, who successfully concentrate on one segment and are companies for a potential merger or takeover (Danone); and aspirants/followers, organic food leaders' competitors, who have a diversified assortment of products and have a relatively strong position in the organic market (Aldi Einkauf and Co hogs and REWE Markt). The above-mentioned companies initiate mergers and takeovers, creating their own delivery systems, implementing the latest innovations and using aggressive marketing on social networking sites.

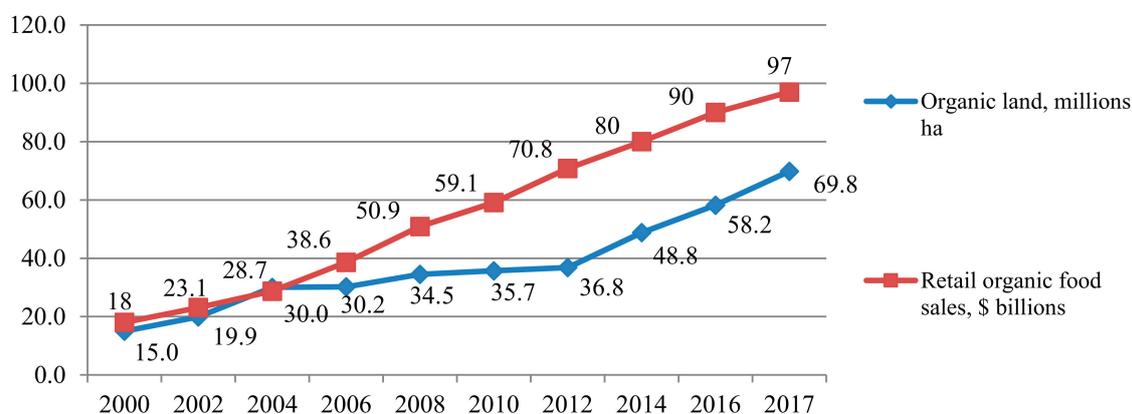
It is crucial to point out that the tendency of goods structure diversification of the organic food market dominates in it; thus, the fraction of gluten-free, protein, hypoallergenic and vegan products is increasing, which is determined by leading a healthy lifestyle and the appearance of new goods

segments (ecofriendly, free-of and nondairy) and services (U-pick, organic agrotourism and delivery in boxes) [66–70].

The peculiarity of such a dynamic evolving in the organic sectors in the world is the development and implementation of developing programs on all levels. Among the tools for supporting the organic sector, there are subsidizing (Paramparagat Krishi Vikas Yojana [71]), specific initiatives for supporting organic market development (European Network for Rural Development (ENRD) [72]), investment into research and technological development (Organic Science Cluster [73]), technical support (League of Organic Agriculture Municipalities and Cities (LOAMC)), state purchases (Sweden—Policy for Sustainable Development and Food, Spain—Organic Foods for Social Consumption and Brazil—National School Feeding Program (PNAE)), national/regional development plans (the National Organic Action Plan (NOAP) and Organic Action Plan for Ireland (2019–2025)), insurance (US Farm Bill), partial covering of certification expenses (US Farm Bill) and institutional support (League of Organic Agriculture Municipalities and Cities (LOAMC)) [74].

### 3.2. Disproportions of the Global Organic Food Market

The global market is characterized by development disproportion caused by different levels of social and economic development of countries, the presence of natural and production resources, state programs for organic production support and the activity intensity of organic movements and pro-organic organizations. Based on the above-mentioned information, three types have been identified. The first type is asymmetry between demand and supply caused by the gap between the dynamics of world organic food sales (330%) and quantity of organic land increases (200%) in 2000–2017 [2,50] (Figure 1).



**Figure 1.** Retail sales of organic food and quantity of organic land in the world. Source: data from the International Federation of Organic Agriculture Movements (IFOAM) and Statista.

The second is the disproportion of production and consumption’s geographic structure (80% of producers are concentrated in Asia, Africa and Latin America, and the largest consumers are European countries and North American countries (Table 4)) and information market asymmetry (there is an underlying statement that organic food producers possess a big quantity of information about organic production, whereas consumers have mainly fragmentary, sometimes controversial information from mass media).

**Table 4.** Number of organic producers in the world and consumption by region.

Region	Index	2016	2017	2016–2017, %	2007–2017, %
Africa	The number of organic goods producers, millions	1.11	1.14	3.3	182.4
	Consumption, \$	-	-	-	-
Asia	The number of organic goods producers, millions	0.74	0.82	9.9	70.6
	Consumption, \$	1.92	2.34	21.87	-
Europe	The number of organic goods producers, millions	0.46	0.45	-1.4	73.7
	Consumption, \$	46.11	56.84	23.27	-
Latin America	The number of organic goods producers, millions	0.37	0.40	6.5	78.7
	Consumption, \$	1.47	1.47	-	-
North America	The number of organic goods producers, millions	0.027	0.026	-2.3	236.1
	Consumption, \$	132.21	134.59	1.78	-
Oceania	The number of organic goods producers, millions	0.018	0.019	3.2	13.0
	Consumption, \$	29.95	35.93	20.00	-
The world	The number of organic goods producers, millions	2.73	2.86	4.7	105.3
	Consumption, \$	12.77	13.79	7.98	-

Note: consumption—per capita consumption. Source: calculated by the authors using data from IFOAM.

#### 4. Overview of the Organic Sector in Ukraine

The organic sector in Ukraine is mainly export-oriented since 80–90% of products are sold abroad. The dominating group includes raw material goods and goods with low added value: crops (47%), seeds, oil plants, berries and honey. Ukraine is a producer of over 400 descriptions of organic goods and exports them to the Netherlands, Germany, Great Britain, Italy, Austria, Switzerland, Belgium and other countries. The lion's share of goods is imported by the USA, Canada, Australia and Asian countries [75–78].

Currently, the organic sector of Ukraine is represented by more than 350 certified enterprises that cultivate more than 400 thousand hectares of land. The main certification companies in Ukraine are Organic Standard (Ukraine), Bio.Inspecta (Frick, Switzerland), Ecocert (L'Isle-Jourdain, France), CERES (Happurg, Germany) and Control Union (Rotterdam, The Netherlands). Organic Standard certifies more than 70% of all organic food operations in Ukraine. The dynamic development of the Ukrainian organic food market has been taking place since 2008; over the last 5–6 years, the domestic market has increased by more than 500% (Table 5).

**Table 5.** Growth indicators for the organic sector of Ukraine.

Year/Indicator	Organic Land, %	Number of Producers	Domestic Market, Millions of \$
2011	0.65	155	5.6
2012	0.66	164	8.2
2013	0.95	175	13.4
2014	1.0	182	16.1
2015	1.0	210	19.3
2016	1.0	360	23.4
2017	0.7	375	32.4
Growth rate, %	-	242	576

Source: calculated by the authors using data from FiBL and the Federation of Organic Movement of Ukraine.

The main number of producers is concentrated in the Odessa, Kherson, Kyiv, Poltava, Vinnytsia, Zakarpattia, Lviv, Ternopil and Zhytomyr regions. The leaders in the organic food market of Ukraine are Haleks-Agro Ltd., EthnoProduct TM, Diamant Ltd., Organic Original Ltd. and Agroecologia Ltd. (Table 6).

**Table 6.** Top eight producers of organic food in Ukraine.

Name of the Company	Organic Exports	Location and Organic Land	Organic Certificates and Certification Body
Haleks-Agro PE	Organic products: grains (oats, rye, barley, buckwheat, millet, corn, etc.). Exports: Switzerland, Germany, Hungary, the Netherlands, Italy, etc.	Zhytomyr region, 8 thousand ha	Certificate of the Institute of Market Ecology (IMO), Organic Standard
EthnoProduct TM	Organic products: milk, sour cream, yogurt, butter, honey, meat, vegetables, grains and legumes. Exports: Germany, Switzerland, Norway, the Netherlands and the Czech Republic.	Chernihiv region, 4 thousand ha	Organic Standard, BioSiusse
Agrofirma Pole LLC	Organic products: millet, organic cereals, legumes and oilseeds. Exports: the Netherlands, Germany, Austria, Italy, Belgium, Australia, Malaysia, Poland, the Czech Republic and France.	Cherkasy region, 9 thousand ha	Organic Standard, BioSuisse, QSCert
Diamant Ltd. LLC	Organic products: instant cereal flakes from all kinds of legumes. Exports: Romania, the Netherlands and the UAE (5%–10% of production).	Poltava region	Organic Standard
Agroecology PE	Organic products: winter and spring wheat, rye, barley, oats, buckwheat, corn and sunflowers. Exports: Switzerland (90%) and Germany.	Poltava region, 8 thousand ha	Organic Standard

Source: own elaboration based on [79–83].

The major issues of organic food market development include the absence of adequate state support for organic production (it concerns software, financial and consulting support, creating a favorable legal climate), relatively low levels of trust of foreign buyers and the passive use of marketing technologies for promoting organic products both in the domestic and international markets. The necessity of vertical integration (cooperatives, clusters) of producers in the organic sector of the country in order to unite production and financial efforts, exchange innovations and technologies and build direct producer–government dialogue has been noted [84,85].

## 5. Data and Methods

Regression analysis is a basic and widely used prediction method used to explain the relationship between one dependent variable ( $Y$ ) and one or more independent variables ( $X$ ). The general idea of regression analysis is to characterize two aspects: assessing the adequacy of the predicted dependence and selecting significant factors that have a direct impact on change and how they affect it. Therefore, the following influencing factors were chosen for the economic analysis of the dependence of the volume of the consumer organic market of Ukraine (Table 7).

Using the MS Excel data analysis package, we obtained the regression equation and the interdependency between the volume of the consumer organic market and the four influencing factors (number of organic enterprises, GDP, average salary and population fraction aged 16–59):

$$Y = 167304.89 + 12.76 \times X_1 + 0.38 \times X_2 + 19.61 \times X_3 - 5.08 \times X_4 \quad (1)$$

which lets us draw a conclusion that provided the number of organic enterprises rises by 1 standard unit, the volume of the consumer organic market will rise by 12.6 standard units; provided GDP per capita doubles, the volume of the consumer organic market will grow by 0.38 standard units; provided the average annual salary increases by 1 standard unit, the volume of the consumer organic market will grow by 19.61 standard units; and provided the population number rises by 1000 standard units, the volume of the consumer organic market will decrease by 5.08 standard units. The next step was to select the factors that affect the performance indicator (Table 8).

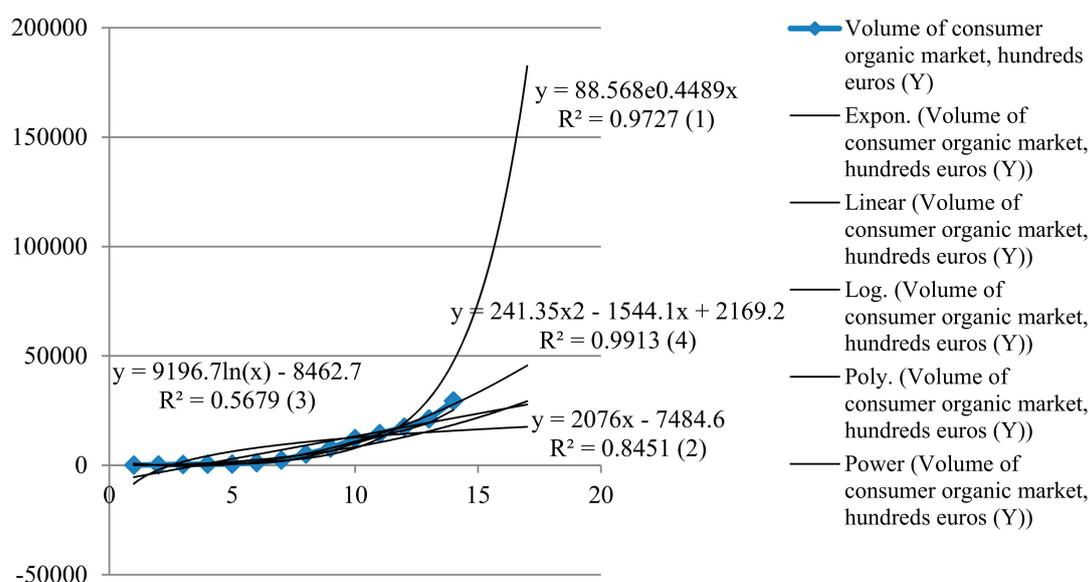
The correlation coefficient is the simplest criterion in the statistical analysis of the production function, which quantifies the relationship between the factor and the indicator. The correlation coefficient ( $r$ ) is a relative measure of the relationship between two features, so it can range from  $(-1)$  to  $(+1)$ . The closer  $r$  is to  $\pm 1$ , the closer the bond is. The “+” sign indicates a direct bond, and the “−” sign indicates an indirect bond. At  $r = 0$ , there is no connection. The obtained dependences are evaluated by the level of indicators of closeness. If their absolute value is less than 0.3, the connection

is weak; when it is in the range of 0.3–0.7, it is average, if it is 0.7, it is close and when the absolute value is 1, this indicates a practically functional relationship. In the study of this production function, the correlation coefficients  $r = 0.94$  and  $r = -0.96$  were determined, which indicates a close relationship and direct dependence of the volume of the consumer organic market ( $Y$ ) on the number of organic farms ( $X_1$ ) and the population aged 16–59 ( $X_4$ ). The estimation of model credibility based on the F-test ( $F$ ) has been carried out. Since the estimated  $F (53.51) >$  table  $F (3.63)$ , it may be stated that the model was adequate with 95% probability. On the basis of the accepted model, it was possible to carry out the economic analysis and forecasting. To predict a further increase in the consumer organic market, we built several graphs (Figure 2).

**Table 7.** Factors influencing the volume of the consumer organic market of Ukraine.

Year	Volume of Consumer Organic Market, Hundreds of Euros ( $Y$ )	Number of Organic Enterprises ( $X_1$ )	GDP ( $X_2$ )	Average Salary, Euros ( $X_3$ )	Population Fraction Aged 16–59, Hundreds of People ( $X_4$ )
2004	100	70	1504.08	89.34	29,514.60
2005	200	72	2011.59	126.15	29,656.30
2006	400	80	2533.22	164.57	29,812.10
2007	500	92	2771.31	195.54	29,799.80
2008	600	118	3524.39	234.68	29,738.50
2009	1200	121	2285.04	206.73	29,586.00
2010	2400	142	2567.34	213.30	29,328.60
2011	5100	155	3089.75	237.93	29,090.10
2012	7900	164	3333.32	295.20	28,842.20
2013	12,200	175	3415.94	308.49	28,622.90
2014	14,500	182	2663.73	221.09	28,372.50
2015	17,500	210	1837.50	173.65	26,613.30
2016	21,200	360	1892.58	183.35	26,317.40
2017	29,400	375	2366.80	236.81	25,982.00

Source: calculated by the authors using data from [2,86,87].



**Figure 2.** Forecasting the consumer market for organic products using trend lines. Source: calculated by the authors using MS Excel data analysis package.

**Table 8.** Correlation coefficients.

Indicator	Volume of Consumer Organic Market, Hundreds of Euros (Y)	Number of Organic Enterprises (X <sub>1</sub> )	GDP (X <sub>2</sub> )	Average Salary, Euros (X <sub>3</sub> )	Population Fraction Aged 16–59, Hundreds of People (X <sub>4</sub> )
Volume of consumer organic market, hundreds of euros (Y)	1	0.9444	−0.1459	0.2992	−0.9644
Number of organic enterprises (X <sub>1</sub> )	0.9444	1	−0.1207	0.31	−0.9351
GDP (X <sub>2</sub> )	−0.1459	−0.1207	1	0.8387	0.3094
Average salary, euros (X <sub>3</sub> )	0.2992	0.31	0.8387	1	−0.1386
Population fraction aged 16–59, hundreds of people (X <sub>4</sub> )	−0.9644	−0.9351	0.3094	−0.1386	1

Source: calculated by the authors using MS Excel data analysis package.

## 6. Results and Discussion

To obtain the predicted data, it is advisable to choose a line that has an approximation reliability ( $R^2$ ) closest to one. The polynomial line had an approximation reliability of 0.99, which confirms that the prediction must be reliable. To obtain the forecast data for the next three years, we substituted the value of X (period number) in the equation  $Y = 241.35 \times x_2 - 1544.1 \times x + 2169.2$  and obtained the forecast data, which we accepted as a realistic growth scenario for the consumer organic market of Ukraine. To calculate the pessimistic and optimistic scenarios, based on the fact that  $R^2 = 95\%$ , we calculated by, respectively, multiplying the actual data obtained by 105% and 95% (Table 9).

Thus, strategic direction of organic sector development in Ukraine foresees the implementation of institutional production and trade bases (a legal base of organic standards and programs and common international projects for supporting organic producers, which will include providing financial, technical and consulting help), creating corresponding infrastructure support, vertical integration (clusters and cooperatives) and a marketing development concept. Potential areas of product and geographical structure development are focusing on niche products, which are poorly represented in certain regions, in particular, fresh vegetables such as sweet potatoes, asparagus, broccoli and cauliflower; cereals; oilseeds; legumes (soybeans, flax and spelt); and fruits such as raspberries, strawberries and blueberries. Focusing on niche product groups is due, firstly, to their relatively high profitability, secondly, to the availability of suitable land (including that not used for organic production) and thirdly, to the presence of unmet demand for these goods. The increase in niche exports is mainly focused on European countries, as Ukraine has an open, large regional market (thanks to the free trade area) and certain established trade relations with some European importers (the Netherlands, Germany, France and others), and the EU has an economic interest in developing organic production in Ukraine, as Ukraine is regarded as an “agricultural hub”—one of the most important suppliers of organic products and, accordingly, importers.

**Table 9.** Scenarios of organic food market development.

Index	Scenario Type								
	Pessimistic			Realistic			Optimistic		
<b>General description</b>	Insignificant export increase, mainly of raw materials to European countries.			Export volume increase due to uniting into cooperatives and production of regional development. Creating Ukrainian organic brand in the existing markets. Use of aggressive popularizing marketing strategy.			Trade agreements will boost entering new markets. Appeal of online trade development in Asian countries must be used as a channel to enter Asian markets. Assortment development using production of goods with high added value; developing vegan and niche product ranges and creating ecopackaging.		
<b>Indicating changes</b>	Renunciation of organic production by some producers; market seizure by foreign companies; absence of informing the population about organic production pros; decrease in domestic demand; absence of assortment diversification; preference of traditional products.			Export-oriented development of organic sector; increase in consumer market will take place at the expense of consumers with high income levels; introducing the variety of assortment mainly in specialized trade points, including shops specialized in imported goods, and a relatively insignificant assortment in supermarkets; weak/moderate marketing activity of organic companies; skeptical attitude of consumers to national organic trademark.			Extending organic assortment in trade points; holding marketing promotional campaigns and organic farm fairs; popularizing organic food value among the population; extension of food logistics routes; vertical producers' integration; extension of state support tools for organic sector; entering foreign markets with ready products; developing online trade; establishing long-term partnering relations with importers; founding competent and professional marketing services; expanding organic land by 5%; receiving more than one organic certificate by organic producers.		
Indicating index	Forecasted market volume	2019	\$44.7 million	Forecasted market volume	2019	\$47 million	Forecasted market volume	2019	\$49.4 million
		2020	\$51.9 million		2020	\$54.7 million		2020	\$57.4 million

Source: own elaboration based on [68,69,78].

## 7. Conclusions

A review of the scientific literature on the topic of the study allows us to identify the strengths and weaknesses of the study. The strengths include the relevance and timeliness of this study, emphasizing the world's leading scientists and experts, as the organic food market is developing dynamically in the US, the EU and China and gaining momentum in other countries. Accordingly, the formation and structuring of the global market and its segmentation, global supply and demand continue with the emergence of new market niches. All these transformations affect all stakeholders of organic businesses: producers, exporters and importers; consumers; governments; etc. Additionally, a number of studies emphasize significant attention to the organic sector paid by the state, which develops and implements programs of state support for the organic sector. This also arouses interdisciplinary scientific interest. At the same time, we can point out the weaknesses of the study because with the exception of the US and the EU, countries have almost no official government statistics on the state of production and the organic market, which greatly complicates studies and makes them limited. This is emphasized by a number of researchers from Ukraine, India, Russia, the EU and other countries. Specialized organizations keep some records and collect primary information, but this information is very limited, and access to its content is complicated by a number of subjective and objective reasons. Interdisciplinary research in emerging market countries (e.g., Ukraine) is a pilot and limited in time, as there is no proper government and business support. All this does not diminish the importance of and interest in studying the formation and development of the global market for organic products, as Ukraine has significant latent potential for organic production and could potentially become a leading exporter in the international market.

However, some aspects of this scientific and practical problem remain insufficiently disclosed; in particular, there is an objective need to deepen the theoretical provisions for determining the dominant factors of formation, structuring and institutionalization of the global organic food market and country and regional studies. Competitive relations in the global organic food market and mechanisms and tools to support and stimulate the development of organic production remain insufficiently studied. In addition, it is extremely important to substantiate the directions of development of the export potential of the organic sector in Ukraine.

Analysis of the findings demonstrated that an increase in global organic food demand caused competition dynamics in the international market. Organic products are a result of using a diversified number of smart and innovative organic food production technologies. Thus, constant producing of innovative decisions and innovation implementation in the organic food production process for supporting sustainable farming are integral parts of organic sector development. The driving countries are North American countries, EU countries and some Asian countries (mainly, China), and countries of Africa are outsiders. Among the dominating tendencies in the market, there are the digitalization of production and trade; the spreading of alternative agricultural methods; job and educational method modernization; agribusiness functional diversification; the ecologization of production and international trade; the fast speed of its growth; and the concentration of organic food producers in Asian, African and Latin American countries and of consumers in North America and EU countries. The specific tendency is the popularization of plant product demand; the extension of product ranges of gluten-free, hypoallergenic, protein and vegan goods, which are assumed to be the basis of vegan eating habits; and the appearance of new segments in the market of goods (ecofriendly, free-of and nondairy) and services (U-pick and argotourism).

This study emphasizes that the organic food market of Ukraine is characterized by an insufficiently developed institutional environment, the absence of proper state financial support, a disproportion between organic raw material and ready organic product exports, an inefficient distribution system, low levels of population awareness about organic food's advantages and dominating small and medium businesses. The main tendency is an excessive export orientation of the market and weak diversification of goods and the geographic structure at the same time. The export-oriented model of the domestic organic sector and vertical integration of market participants may potentially promote

receiving competitive advantages in the global organic food market, which will favor optimization of production and the trade structure, cooperatives of producers, experience and innovative technology exchanges. The export potential of the organic sector of Ukraine can be realized through increasing competitiveness in the global organic food market by meeting the demand for a specific category of goods, the volume and range of which are underrepresented in some regions, and the development of new food logistics schemes.

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