

**Cornelia ALBOIU**

*Institute of Agricultural Economics, Bucharest, Romania  
coraalboiu@yahoo.com*

## THE ROMANIAN FRUIT AND VEGETABLE PROCESSING INDUSTRY CAPACITY OF CREATING VALUE ADDED – DIFFICULTIES AND OPPORTUNITIES IN AN EUROPEAN COMPETITION CONTEXT

### ABSTRACT

The purpose of this paper is to give a brief overview of the Romanian fruit and vegetable processing industry and its capacity to generate value added and increased turnover in order to contribute to local development. In this regard, several indicators were analysed such as value added by value chain segments, gross operating surplus and turnover for the Romanian vegetable processing companies as well as for the wholesale segment of the value chain in comparison with several EU countries. The study concludes that the Romanian fruit and vegetable processing industry is found in a very modest position compared to other EU competitors. Thus, it requires important investments in processing companies, in new production technologies and processing cooperatives, as well as support for the creation of producer groups. Also, investments in primary production should be prioritised as the industry is confronted with important deficits regarding the supply of raw materials from local production.

**Key words:** fruit and vegetables, value chain, value added

**JEL Classification:** Q13, Q19

### 1. INTRODUCTION

#### THE EUROPEAN CONTEXT OF THE EVOLUTION OF VALUE ADDED IN THE FOOD CHAIN

According to a study elaborated by Eurostat, in 2024, the value added from the EU's agricultural industry was equivalent to 1.4% of gross domestic product (GDP), signalling a slightly increase compared to 2007 (1.3% of GDP) (Eurostat, 2024). Thus, the ratio between the value added of the agricultural industry and GDP in 2022 was remarkably higher in the case of Romania (3.5%), Bulgaria (3.4%) and Greece (3.1%) than in any of the other EU member states. This situation is an illustration of the fact that the share of the other segments of value chain in Romania's case is smaller compared to the other segments such as processing, wholesale and services (including restaurants and catering).

The next highest ratios were noticed in Croatia 2.4% and Lithuania. In 12 member states, value added from the agricultural industry was equivalent to 1.0% or less of GDP; the lowest ratios were 0.3% in Malta and 0.2% in Luxembourg. Between 2007 and 2022, the share of the value added of the agricultural industry to GDP increased in nine EU member states. The largest increases were recorded in Greece, by 0.7% and Latvia, by 0.5%. The largest decreases were recorded in Malta, Estonia and Cyprus, by 0.5%, while in Romania the decrease was even higher, by 1.2%.

According to the Eurostat study, in 2022, France's agricultural industry had the highest value added among the EU member states, contributing by 18.9% to the EU total. Italy had a share of 16.7%, followed by Germany with 13.6% and Spain with 13.3%; none of the remaining member states registered a share in double-digits. In 2022, compared to 2007, Spain and Italy had their value added in the EU value added decreased by the highest share (down by 3.2% and 1.6%, respectively). The largest increases were recorded for Germany (up by 3.1%), reflecting very fast growth in value added between 2021 and 2022, while both Ireland and Poland recorded an increase by 1.1%.

## 2. STATE OF KNOWLEDGE

There are several authors who analysed the value added and the importance of creating value added in a sector. Thus, generating value added for agri-food production is known as one of the most significant managerial actions in local sustainable economic development. Actually, adding value to local agricultural production contributes to the accomplishment of rural economic growth goals, directly by establishing an adequate system for improving job creation and local economy development (Barbier, 2007). It is worth noting that the development of agro-industries has been known as an important contributor to local economic development. Consequently, creating value added can effectively help sustainable development in its economic and social dimensions.

For example, Spain holds a significant share of the world saffron market by developing the domestic packaging industry for this special product (Sanjuán L. and Resano E., 2020). In the same range of examples, Germany is a major exporter of natural extracts from horticultural crops through the development of processing industries. Thus, Germany is another relevant example, whose domestic production of horticultural crops accounts for about 0.27% of global production. These economic achievements resulted from the development of the processing industries of local production of raw materials. Local processing can be an important income and development source for the local community and this can be achieved through investments in processing at local level.

In addition, the insufficiency of modern processing and packaging facilities limits the potential of adding value to the production of vegetables in established vegetable basins. To address these challenges, a series of policies and measures are

needed to support the cultivation and processing of fruit and vegetables. These include subsidies to farmers, investments in modern processing and packaging facilities and promoting the processed products on local and world markets.

Some of the constraints to local economic development in the Romanian fruit and vegetable processing sector include: 1) insufficient infrastructure and supply chain contracting 2) insufficient investments in the processing industry to create value added and 3) poor development of necessary infrastructures for collecting, sorting, and packing. To solve these problems, many countries have developed medium and long-term financing initiatives, establishing the necessary infrastructures for industrial development, creating jobs, expanding exports, reducing taxes and building educational infrastructures, most of which focusing on the development of local agro-processing industries (Ciani *et al.*, 2020).

### 3. MATERIAL AND METHOD

The analysis is based on statistical data retrieved from Eurostat and covers the period 2011–2020, data being collected for several countries, such as Poland, Bulgaria, France and Italy. The analysis used several business indicators such as value added, turnover, value added per employee, and they helped to compare the Romanian vegetable supply chain with some competitor countries. Also, the analysis depicts the share of value added in each value chain segment at the level of the agri-food chain and at the level of the fruit and vegetable sector.

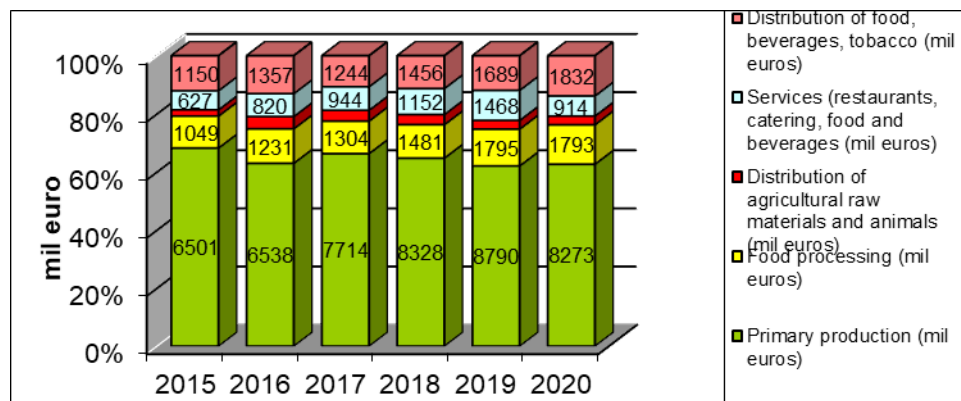
### 4. RESULTS AND DISCUSSION

#### 4.1. DISTRIBUTION OF VALUE ADDED ON THE FOOD VALUE CHAIN IN ROMANIA

The creation of value added in the food chain is a very important aspect in the economy of a country, as this can reveal the degree of industrialisation and the capacity to add value in the chain. Gross value added is the balancing item in the production account and is measured as the difference between the value of goods and services produced (assessed at basic prices) and intermediate consumption (assessed at buyer prices), thus representing the newly created value in the production process. Value added is conceptually close to GDP (gross domestic product), but unlike GDP, this is available in a breakdown of economic activity by sector/segments.

As it can be seen in Figure 1, there are important value gaps by the main segments of the food value chain in Romania. Thus, a low share of value added of the food industry can be noticed in the food chain (12%), of food distribution (12%), of food services (8%), and raw materials distribution (3%), compared to the

very high value added of primary agricultural production (65%). Comparatively, in the European Union, the value added of primary production in the value chain is 25%, of food industry 26%, of food distribution 31%, and of services 18%.



Source: Author's calculations based on Eurostat data.

Figure 1. Share of value added in the food chain in Romania, 2015–2020.

At the same time, a low value added of the food value chain can be noticed, due to the low value added produced by the processing industry, of food distribution and consumer services (including restaurants, food and beverage catering).

However, in the year 2020, an increase in the value added of consumer services could be noticed, which represented 914 mil. euros, higher by 45.7% compared to 2015, as well as in the distribution of food, beverages and tobacco. Therefore, a very slight rebalancing tendency of this situation can be noticed. Thus, in the year 2020, the value added of primary production was down to 63% from 68% in 2015, while the value added of processing industry increased to 14% in 2020 compared to 11% in 2015. It should be mentioned that distribution includes distribution to chain stores, specialised stores, non-specialised stores, companies involved in wholesale and retail sales of foodstuffs, etc. Consumer services refer to sales through restaurants and catering.

#### 4.2. DISTRIBUTION OF VALUE ADDED IN THE VALUE CHAIN OF FRUIT AND VEGETABLES IN ROMANIA ON A COMPARATIVE BASIS WITH CERTAIN EU MEMBER STATES

Although gross value added had an increasing evolution in the analysed period, it remains far below the values recorded in France and Italy and even compared to Poland and Hungary (Table 1). This is the consequence of insufficient production facilities and of the fact that in Romania very small quantities of vegetables intended for processing are produced, and processing is mainly based on semi-processed imported goods (also from the Asian area).

Table 1

Gross value added of fruit and vegetable processing industry, mil. euros

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Dynamics 2020/2011 (+/- %)
Bulgaria	61.7	55.8	62.5	63.2	77.6	91.3	96.2	105.8	115.2	125.7	104
France	1,430.6	1,431.0	1,458.6	1,453.9	1,619.4	1,567.4	1,686.9	n.a.	1,920.1	1,899.8	33
Italy	1,675.7	1,398.3	1,552.4	1,689.3	1,754.9	1,938.9	1,997.9	2,050.8	2,110.1	2,209.0	32
Hungary	152.6	148.4	155.5	176.5	165.2	184.3	191.1	196.7	195.6	230.0	51
Poland	750.2	780.0	750.0	784.5	874.2	889.6	945.8	1,202.0	1,277.0	1,319.0	76
<b>Romania</b>	<b>73.2</b>	<b>79.6</b>	<b>82.7</b>	<b>78.3</b>	<b>80.3</b>	<b>62.2</b>	<b>83.3</b>	<b>84.5</b>	<b>94.3</b>	<b>108.5</b>	<b>48</b>

Source: Author's calculations based on Eurostat data.

According to the representatives of the Interprofessional Organisation of Fruit and Vegetable Producers, less than half of the raw products grown in Romania go to processing factories. As regards the degree of coverage of the processing capacity in the food industry, although no official data exist, according to the sector representatives, this is 60-70% over the summer and under 40% over the winter, the highest deficit being found in tomatoes for processing. Romania covers only 10% of the sales of tomato paste and vegetable stew (*zacusca*), as compared to 60–70% in the 1990s. China, which benefits from the advantage of great productions and cheap labour, massively exports tomato paste to Romania, generally of poor quality, according to the statements of sector representatives. The total fruit and vegetable processing capacity is about 160,000 tonnes/year (Interprofessional Organization of Fruit and Vegetable Producers). Tomato paste, vegetable hodgepodge, vegetables for soup and frozen vegetables have the most important share in the processing of vegetables.

Romania is a net importer of processed products, and the Romanian processing companies cover only partially their needs for raw materials from domestic production. In 2019, the processing and preservation of fruit and vegetables represented a small percentage of the value added of the food sector, *i.e.* about 3%, next to sectors such as meat and meat, flour and dairy products. The distribution of fruit and vegetables also represents a very small percentage of the value added of the food sector, namely 5%. Consumer services represent about 1%. This reveals that in this sector the creation of value added in the food chain is very low and unbalanced and highlights the need to reorganise the chain. Therefore, the supply of fresh and processed fruit and vegetables has quite a low value added, mainly due to the poor organisation of producers (less than 1% degree of association, compared to the EU average of 45%, or over 100% in the Netherlands, which has producer organisations, associations of producer organisations and cross-border cooperatives) (Alboiu, 2022).

The share of vegetables in total agri-food imports had an ascending trend in both pre- and post-accession periods until 2019, to slightly drop in the last three

years, despite a steady increase in value and quantities in nominal terms. In the pre-accession period, vegetable exports were mainly directed to the EU countries (over 80%), while most imports (over 50%) originated from extra-EU countries (mainly from Turkey and the Republic of Moldova). After the accession to the EU, exports remained directed to EU countries, but imports shifted to originate from EU countries as well (50–80%), as the principle of community preference applied (Gavrilescu, 2023).

On the other hand, Poland produces over 4.1 million tonnes of vegetables and 4.6 million tonnes of fruit each year, out of which only 15% of vegetables and 50% of fruit are used for processing. There has been a consumer trend towards a healthy lifestyle for many years. Consumers are currently more aware when they buy food products by reading the product labels and are increasingly choosing natural foods. In a study by Kuboń *et al.* (2019), about 50% of a group of 100 persons preferred lightly processed foods, with no artificial colour additives and preservatives.

#### 4.3. GROSS VALUE ADDED PER EMPLOYEE IN THE FRUIT AND VEGETABLE PROCESSING INDUSTRY

By sub-segments, the net result of fruit and vegetable processors increased by 33% and of traders by 42%; in the segment of primary production, this increased by 50% in 2020 as compared to the year before the pandemic.

Table 2

Gross value added per employee in the fruit and vegetable processing industry, thousand euros

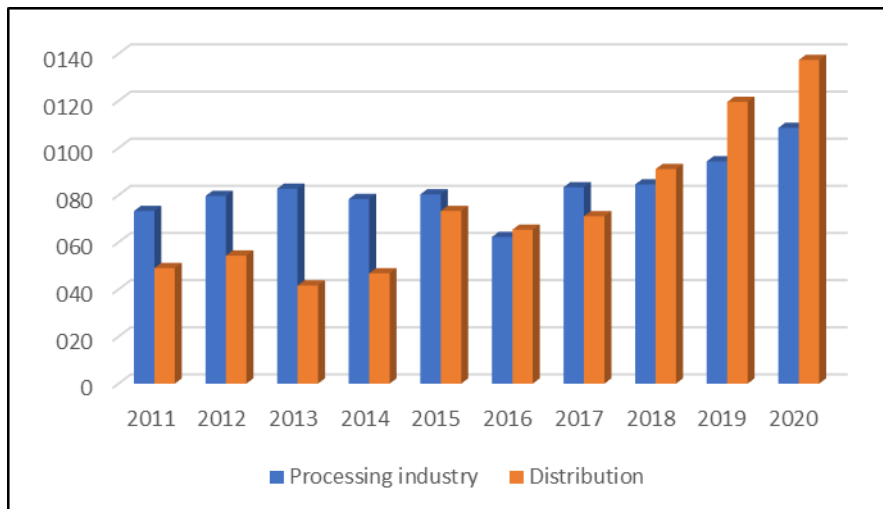
Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020/2011 dynamics	2020/2015 dynamics
Italy	59.6	52.9	57.2	60.7	62.5	65.2	64.2	64.6	64.5	63.9	7.2	2.2
Hungary	20.2	19.4	20.7	22.4	20.8	22.5	22.2	23.6	24.7	29.0	43.6	39.4
Poland	23.7	24.6	24.5	25.2	27.6	26.5	27.1	31.4	33.0	34.0	43.5	23.2
<b>Romania</b>	<b>13.1</b>	<b>14.6</b>	<b>15.3</b>	<b>14.5</b>	<b>14.3</b>	<b>13.0</b>	<b>16.7</b>	<b>15.9</b>	<b>16.8</b>	<b>18.3</b>	<b>39.7</b>	<b>28.0</b>
France	58.0	61.4	60.3	65.0	65.7	62.8	65.2	n.a.	71.7	69.6	20.0	5.9

Source: Author's calculations based on Eurostat data.

On the other hand, although apparently significant increases were noticed in the sector in the last 5–6 years as it results from the analysis presented above, according to a study conducted by EIR in 2023, "The apparent labour productivity in the fruit and vegetable processing and preservation industry is **three times lower in Romania than in France and almost twice lower than in Poland**, but the investment rate and the operating profit rate have comparable values (even higher, which reveals the willingness to invest in this industry)" (Luca *et al.*, 2023).

#### 4.4. GROSS VALUE ADDED IN THE VALUE CHAIN OF FRUIT AND VEGETABLES, ROMANIA'S AND POLAND' CASE

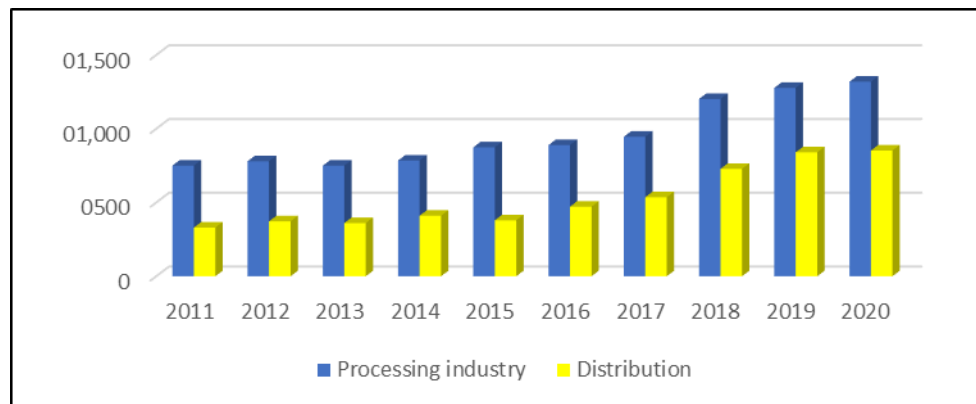
The value added of the fruit and vegetable food chain in Romania is very low. Although the processing industry registered a constant growth in the period 2011–2020, to reach 108.5 mil. Euros in 2020, up by 48% compared to 2011, this increase is modest compared to Poland and Bulgaria. Furthermore, starting with 2018, as it can be seen in Figure 2, a reversal of the share of the two important segments of the chain can be noticed, in the sense that the value added of fruit and vegetable distribution becomes higher compared to the value added of the processing segment. This is a particular situation, no longer found in any of the analysed countries, which reveals the inability of the fruit and vegetable processing industry to create value added at the level of EU competitors, where the average share is approximately 26%, while the value added of the wholesale industry is almost similar.



Source: Author's own calculations based on Eurostat data.

Figure 2. Gross value added in fruit and vegetable processing and wholesale industry in Romania.

The graph below presents, for comparison, Poland's case, where the share of value added in the processing industry has remained constantly higher than in the distribution of fruit and vegetables, a situation which can be also found in other countries, such as Bulgaria, Hungary, Italy or France.



Source: Author's own calculations based on Eurostat data.

Figure 3. Gross value added in the value chain of fruit and vegetables in Poland.

In the post-accession period, Poland has developed a strong local processing industry and an efficient distribution system that put into value the local fruit and vegetable production and create value added in this sector, thus contributing to local development in this country.

As it can be seen in Figure 3, in the year 2020, Poland had 10 times higher values of the value added obtained by the processing industry compared to Romania, while the fruit and vegetable distribution segment was approximately ten times higher compared to that of Romania. It should be mentioned that this proportion was also valid in the year 2011, which proves that Romania has not been able to bridge the productivity gap in any of the two segments.

#### 4.5. GROSS OPERATING SURPLUS

The gross operating surplus (GOS) is the amount of money left at the company's disposal after paying salaries and taxes. GOS describes the operating profitability of a company over a complete operating cycle. The financial balance of a company can be analysed by comparing GOS from one year to another. GOS can be also used to measure pre-tax earnings, minus amortisation and depreciation.

The gross operating surplus of fruit and vegetable processing companies in Romania is the lowest compared to the other analysed countries, almost three times lower than that of Hungary and even ten times lower than that of companies from France. However, an improvement of the situation could be noticed in the year 2020 compared to 2019, the gross surplus being the highest in the year 2020 compared to previous years (Table 3).



Table 3

Gross operating surplus, mil. euros

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020/2011 dynamics	2020/2015 dynamics
Italy	738.3	490.5	589.2	687.3	715.3	843.1	852.5	851.7	860.8	904.4	22.5	26.4
Hungary	84.5	75.5	83.1	99.2	84.4	91.7	86.8	91.8	87.9	120.5	42.6	42.8
Poland	414.2	430.1	398.6	422.8	489.6	479.5	486.3	649.7	657.8	698.7	68.7	42.7
<b>Romania</b>	<b>37.4</b>	<b>41.7</b>	<b>42.7</b>	<b>39.5</b>	<b>35.6</b>	<b>22.2</b>	<b>37.8</b>	<b>34.6</b>	<b>34.1</b>	<b>43.2</b>	<b>15.5</b>	<b>21.3</b>
France	385.2	391.2	422.6	466.4	544.2	478.0	527.8	n.a.	598.8	543.2	41.0	-0.2

Source: Author's own calculations based on Eurostat data.

The net result of the fruit and vegetable industry exceeded the value of one billion RON for the first time, after an increase of 42% compared to 2019 and 332% compared to 2016, to reach 1.3 billion RON in 2020.

#### 4.6. SHARE OF GROSS OPERATING SURPLUS IN VALUE ADDED

*The gross operating surplus (GOS)* is the result obtained from the current activity of a company, which allows measuring the capacity to generate and conserve funds in operating conditions. It is independent from the funding and investment policy of a company and is calculated using the formula:

$$GOS = VA + \text{Operating subsidies} - \text{Other taxes, charges and similar payments} - \text{Personnel expenses}$$

The value added expresses the increase in value resulting from the use of production factors, mainly labour and capital, over the value of raw materials, materials and services purchased by the company from third parties.

Table 4

Share of gross operating surplus in value added (%)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020/2011 dynamics	2020/2015 dynamics
Italy	44.1	35.1	38.0	40.7	40.8	43.5	42.7	41.5	40.8	40.9	-7.3	0.2
Hungary	55.3	50.9	53.4	56.2	51.1	49.8	45.5	46.7	45.0	52.4	-5.2	2.5
Poland	55.2	55.1	53.1	53.9	56.0	53.9	51.4	54.0	51.5	53.0	-4.0	-5.4
<b>Romania</b>	<b>51.1</b>	<b>52.4</b>	<b>51.6</b>	<b>50.5</b>	<b>44.3</b>	<b>35.6</b>	<b>45.4</b>	<b>41.0</b>	<b>36.2</b>	<b>39.8</b>	<b>-22.1</b>	<b>-10.2</b>
France	26.9	27.3	29.0	32.1	33.6	30.5	31.3	n.a.	31.2	28.6	6.3	-14.9

Source: Author's own calculations based on Eurostat data.

The share of gross operating surplus in value added reveals quite a fragile financial position of processing companies in Romania (Table 4), but which

improved in 2020 compared to 2019. However, a comparison with the other analysed countries reveals that Romanian companies have the lowest financial balance.

#### 4.7. TURNOVER OF THE FRUIT AND VEGETABLE PROCESSING INDUSTRY

Turnover represents the sum of sales of goods and/or services of a company over a set period (financial exercise). This indicator reflects the amount of cash received in sales of products delivered. It is also called total receipts or gross income.

As it can be seen in Table 5, the turnover in the fruit and vegetable processing industry decreased by approximately 81% in 2020, compared to 2011. This is a significant decrease, given that Romania is the only country among the analysed countries that had this decrease in turnover.

Table 5

Dynamics of turnover evolution in the fruit and vegetable processing industry in Romania and some EU member states (million euros)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Dynamics (+/-%)
Poland	1,192.3	1,372.9	1,338.0	1,316.3	1,353.6	1,479.2	1,505.0	1,986.7	2,044.4	1,809.2	52
<b>Romania</b>	<b>73.9</b>	<b>78.1</b>	<b>78.7</b>	<b>75.2</b>	<b>91.0</b>	<b>12.0</b>	<b>8.2</b>	<b>10.9</b>	<b>13.1</b>	<b>14.1</b>	<b>-81</b>
Bulgaria	283.8	274.4	311.4	315.8	326.8	400.4	468.2	474.0	455.4	497.1	75
Italy	9,976.3	9,032.4	9,909.8	10,170.9	10,639.8	11,007.5	11,565.3	11,844.9	12,057.5	12,397.9	24
France	7,743.3	7,681.4	7,832.1	7,158.3	7,732.6	7,872.1	8,765.9	n.a.	8,997.9	8,758.9	13
Hungary	799.2	854.2	866.6	886.0	851.2	966.3	1,027.0	1,006.3	970.0	1,026.5	28

Source: Author's own calculations based on Eurostat data.

As regards the distribution segment, turnover increased by 20% in Romania in 2020 compared to 2011, a similar increase to that of France or Italy. Poland stands out again with an increase of over 95% in the year 2020 compared to 2011.

Table 6

Dynamics of turnover evolution in the fruit and vegetable distribution sector in Romania and some EU member states (million euros)

Turnover	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Dynamics (+/-%)
Poland	4,270	4,954	5,652	5,598	6,101	5,796	7,052	7,383	7,922	8,334	95
<b>Romania</b>	<b>1,282</b>	<b>996</b>	<b>936</b>	<b>988</b>	<b>1,108</b>	<b>1,237</b>	<b>1,323</b>	<b>1,314</b>	<b>1,490</b>	<b>1,536</b>	<b>20</b>
Bulgaria	335	368	388	414	458	482.0	530	534	591	606	81
Italy	21,172	21,591	22,43	21,582	24,149	24,501	24,656	25,381	24,777	24,737	17
France	17,838	19,297	20,252	17,941	18,662	19,975	21,186	19,615	20,626	21,590	21
Hungary	1,012	955	1,02	913	960	1,003	1,078	1,018.5	1,041	1,027	1

Source: Author's own calculations based on Eurostat data.

Although the volume of sales in the fruit and vegetable distribution segment seems to be in a better position compared to the processing industry, it is still far below the level recorded in Poland, France or Italy. This is due to an insufficiently developed collection (packaging and labelling) system meant to ensure product attractiveness and safety for consumers; this adds to a poor endowment with technical equipment for washing, sorting, storage and transport of production to the market. The lack of good production planning and management adapted to market requirements also prevents obtaining a sales volume similar to that of countries with which the comparison was made.

## 5. CONCLUSIONS

In Romania, the processing industry has significantly grown in recent years, although it still lacks full ability to adapt to the market, and is not fully anchored yet to primary producers' needs, on the one hand, and to consumers' demand, on the other hand.

However, the value added at the level of the Romanian value chain of agri-food production is quite unbalanced, with a value added of agricultural production of over 60%, while the EU average is 25%, and of the Romanian processing industry of about 16%, while the EU average is around 26%. A similar situation is found at the level of the Romanian agricultural fruit and vegetable chain. The volume of sales decreased in the fruit and vegetable processing industry in the analysed period, while the volume of sales in the distribution segment increased by over 20%. However, Romania's position is modest compared to countries such as Poland, Hungary, Italy or France.

In conclusion, important investments are needed to reach the objective of this industry to contribute to local development by increased value added and for a better valorisation of local raw materials. The National Strategic Plan provides such opportunities, and the investments in off-farm conditioning, storage and processing of agricultural and horticultural products is one of the measures of the National Strategic Plan that will contribute to the consolidation of enterprises in food industry, by providing non-refundable public support for modernisation investment projects of up to 3 million euros per project (this value can increase up to 7 million euros in the case of projects for setting up processing companies and even 10 million euros for new investments in fruit and vegetable processing).

Fruit and vegetable primary production should be also prioritised in the NSP, as the industry can supply its need for raw materials from domestic production only in a very small proportion, i.e. by about 30%.

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