

THE IMPORTANCE OF THE PROCESSING SECTOR IN THE AGRI-FOOD INDUSTRY

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Abstract

Food processing represents the effective commodity physical transformation; besides that, it is an opportunity in the value-chain from farmers to high-end manufacturers. Many factors influence the evolution of this food sector, but one of the most important one is represented by the continuous development of consumers demand for healthier and cleaner food. The current paper aimed at showing the importance of the processing sector in the food chain.

The current paper has noted various remarks about the food processing sector for Romania and other European Member States: Greece, Croatia, Latvia, Hungary, Poland, and Portugal as these states have comparable GDP/capita levels to Romania and has also briefed the respective crop and animal production levels using international databases as information source.

The present study has highlighted the importance of the processing sector. As the value added from the agricultural industry has constantly improved in Romania's case, it could have been observed from the available data that processing has generated more revenue for both the farms and for the whole industry.

Keywords: Food processing, agri-food industry, food value chain, food supply chain.

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Introduction

Processing refers to the activities that transform agricultural commodities into various forms that add value to the product, which brings a higher return to the farmer. The growth of agro-processing industry plays a vital role in national economic development and has the potential to meet local needs and export requirements. As it envisages the increase in agricultural production, there is a need for commensurate growth in the agricultural processing industry.

1. Literature review

Food processing is essential to its preservation, safety and security and it enables all people to sustainable store products for a healthy life and diet. Scientific research has pointed out the importance of rationally tackling food processing at it is a key link in a food system that has to feed an expected population of 9 billion (Knorr & Augustin, 2021).

Heat application in households during cooking of food involves various processes, such as frying, boiling, baking, steaming, roasting, stewing, microwaving and modern steam ovens. In industrial applications, the same processes are used but at a larger scale. Translating consumer expectations over the textures, flavours, and health benefits into industrial scale processes of food, represents a major challenge for the current food industry that is held in place by underutilisation of modern food-processing technology (Boekel et al., 2010)

The industrial category where agriculture is a raw material manufacturing has developed differently than the classic agri-food processing sector.

Food demand is known to be situated at a higher rate than the supply capability in the Romanian market determining the retailers to import both fresh and processed food products. In parallel, as the population's purchasing power has grown, demand has also met an ascending trend, especially for foreign products that are not to be found locally.

Agri-food sector has been mostly influenced negatively regarding inputs, especially due to labour force migration. Fruit and vegetable harvesting have been the most affected sectors as they are heavily labour-dependent.

In the food industry is widely known that to thrive, businesses need to be competitive and highly optimized in both economically and environmentally aspects. A new concept has been emerged in the research literature, that of Green Food Processing, where the final consumer benefits of an environmentally friendlier product; obviously, to have this process applied more frequent, educational work needs to be done, as green washing's shortcuts arise. In this regard, Avignon University managed to apply these processes in laboratories via ultrasound and microwave energy usage as energetical sources for food processing techniques for marination, maceration, and extraction (Chemat et al., 2017).

2. Description of the processing sector's importance in the food value chain

It is common knowledge that processing represents an opportunity to add value to the agricultural products, therefore scientific research is defining agricultural products that bring added value as one of the following processes that the product has sustained: physical structure change (processing involving structural conversion); enhanced production manner (organic, circular or sustainable production); value-enhancing enabled as a result of specific transformations (e.g., organic product); supplies renewable energetical reusage (e.g., food waste collection to generate energy); belongs to a locally produced food scheme (Clark et al., 2021).

Many economists believe that the agricultural processing sector is an important driver of economic development, such as: increasing GDP by providing additional goods and new processed products to the country; the provision of income and employment in rural areas, due to their strong link back to primary agriculture, thus reducing the uneven distribution of income and diminishing the current problems of rural-urban migration; creating a source of exports and foreign exchange; providing training for new unskilled workers as well as additional benefits, thereby raising the level of education and the standard of living prevalent in underdeveloped areas; and stimulating agricultural production by creating new stable intermediate markets for raw agricultural products and assisting producers in improving agricultural mode in some processing activities through vertical integration and production contracts with processors.

A very important feature of the processing industries is its close relationship with other important sectors of the economy, such as the food and wholesale sectors, which create thousands of jobs, as well as with the service sector and the growing tourism industry, which bring a development vigorous increasing demand for processed food products.

Besides the economic aspect, food processing is also a key aspect in the challenge of achieving the global food and nutritional security. Research has pointed out that due to the latest environmental concerns, both production and processing in the food industry will be permanently challenged to make use of a smaller quantity of resources to produce larger food quantities through continuous innovation, also tackling the nutrition (Augustin et al., 2016). Food processing should also be overseen through the consumer lenses; people tend to seek food that is affordable, safe, at-hand, natural, fresh (processing & packaging minimalized),

clean (without preservatives and negative substances). Consumers are also interested in products that are offering sort of aiding and risk-diminishing benefits; aspects that have made of the processors' activity a very demanding one.

Novel food technologies are to be considered together with their way of influencing the sensorial perception in the food choice clearly creating difficult-to-adapt environments for the processors, especially when introducing novel technological processes as consumers perceive them with some concerns (Cox et al., 2011).

Consumers need to be educated about the beneficial part of the new technologies as even in the case of documented beneficial processing innovation, consumers hesitate and only time and habitude help (Jaeger et al., 2015).

3. Materials and methods

In the analysis chapter of this paper several countries have been prospected. The chosen states as study's population have been picked based on the GDP/capita indicator from the European Union, the picked countries reported similar values to the ones of Romania with ranging values around 36.000 USD/capita (value recorded in year 2021). The selected European Member states that recorded values around 36.000 USD/capita are: Greece, Croatia, Hungary, Latvia, Poland, Portugal, and Slovak Republic.

To point out the importance of the food processing economic sector, several indicators have been selected from international databases such as: The World Bank, Eurostat and Agridata and the Romanian National Institute of Statistics.

The purpose of the following analysis is to point towards the Romanian processing's sector trajectory, highlighting its importance and the latest improvements, in a comparative manner to other similar EU countries in terms of GDP/capita.

4. Research results

Academic literature has previously used the GDP indicator in comparing European Member States for their processing output, one study is (van Grinsven et al., 2015) that emphasises the need for a sustainable intensification of the food system. The main reason for comparing Member States in this study at the GDP/capita level as opposite to the Gross Value-Added indicator comes from the need to extrapolate subsidies and taxes, as it is known how they impact agricultural landscape.

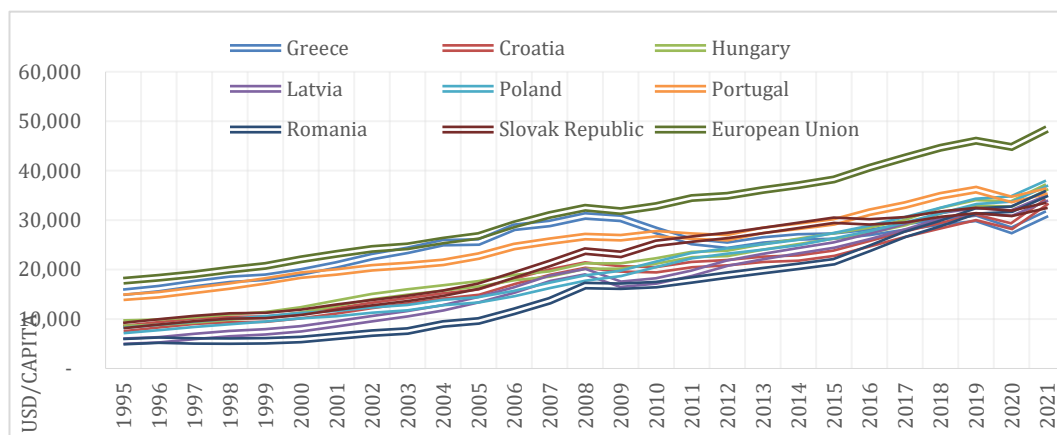


Figure 1. GDP/Capita for EU Member states & EU average

Source: The World Bank (WB, 2022a)

According to the data presented in the above figure, the largest GDP/Capita yearly growth has been recorded in Romania at 7.7%, followed by Latvia 7.5% and Poland 6.3% while the EU has recorded an average yearly increase of 4% for the same 1995-2021 period. The largest absolute value was recorded in Poland at 37503 USD/Capita, Romania sitting at 35414 USD/Capita and the lowest amount was recorded in Greece at 31295 USD/Capita. For this 8 selected Member States, the representation of the GDP/Capita in 2021 for the total EU average sits at 71.8%.

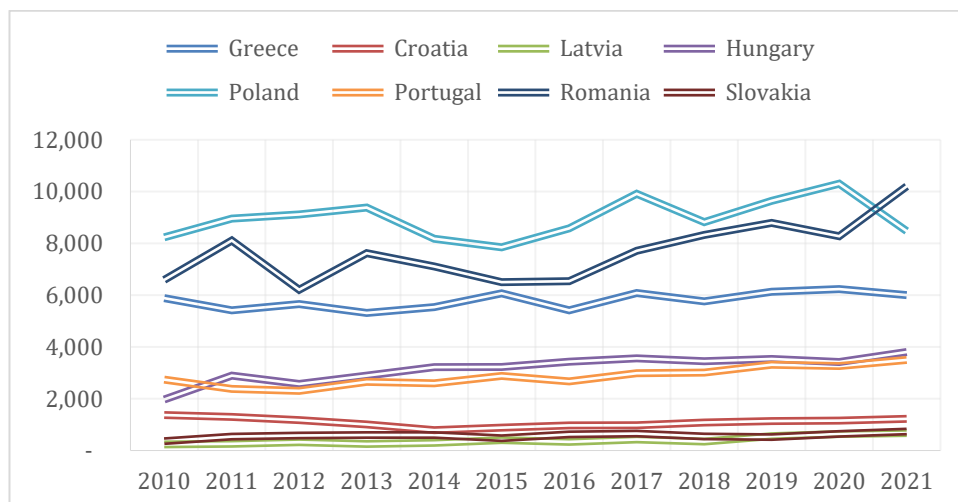


Figure 2. Gross value added of the agricultural industry - basic and producer prices (million euro)

Source: Eurostat (Eurostat, 2022a)

As seen in the above figure, the largest added value in 2021 has been recorded in Romania, 10.2 billion euros and Latvia sitting with the lowest value in 2021 at 673 million euros. The annual growth for Romania sits at 5.1%, while Hungary (7%) and Slovakia (8.4%) sit at better values despite the huge difference in absolute values.

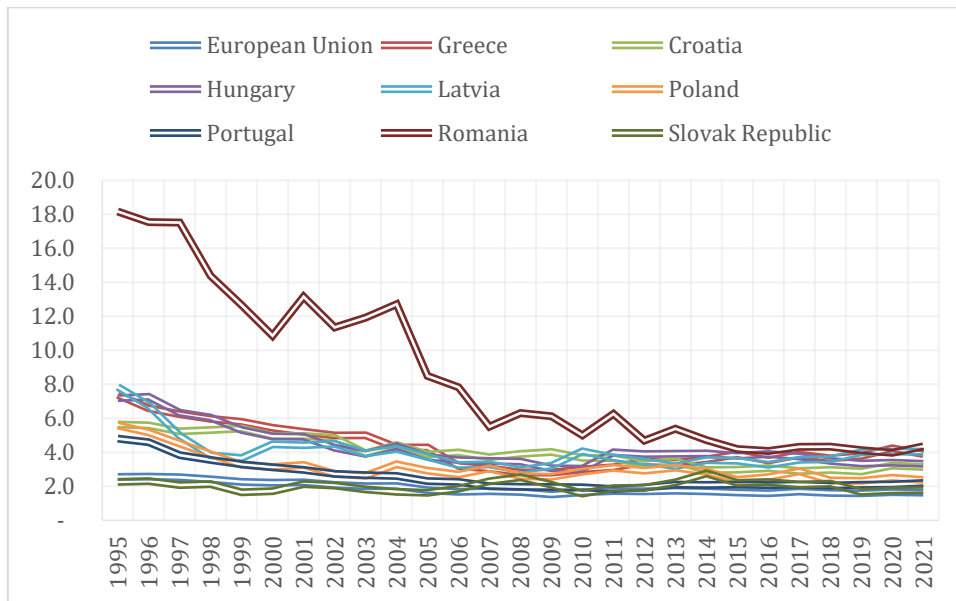


Figure 3. Agriculture, forestry, and fishing, value added (% of GDP)
 Source: The World Bank (WB, 2022b)

As presented in the above figure, agricultural importance in GDP has diminished overtime, a process that is matching with the overall economic development across European Member States. The largest improvement is recorded for Romania, an annual decrease of 4.2% while for the European Union, a value of 1.6% has been recorded. Romania (4.1%) recorded similar percentages in the last 3 years of analysis as Greece (4%) and Latvia (4%) while Poland, Portugal and Slovak Republic recorded lower values 2.4%, 2.1% and 1.7% respectively.

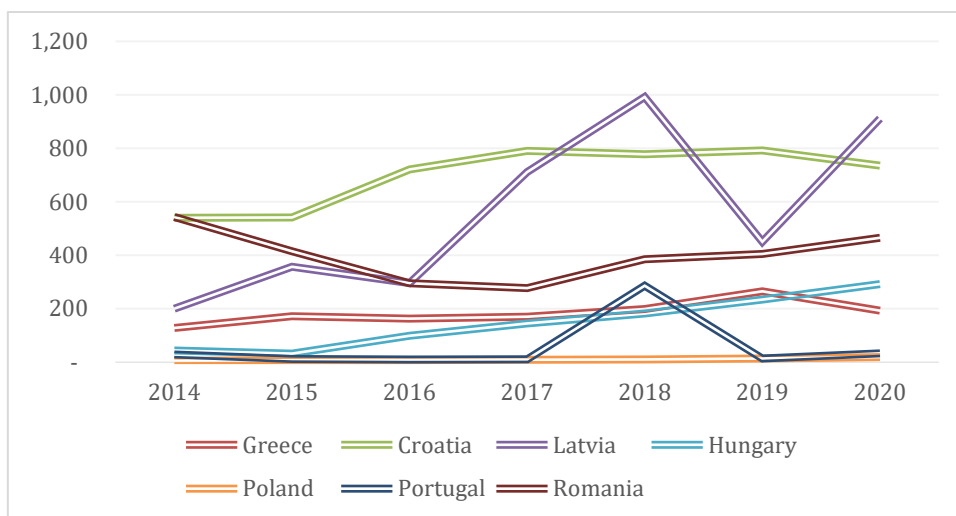


Figure 4. Processing of animals and animals' products (€/farm)
 Source: Agridata (AG, 2022a)

As seen in the above figure, most countries recorded an ascending trend. The variance in 2020 compared to 2014 is sitting at a 51% growth for Greece, 36% growth for Croatia, 3.5 times growth for Latvia, 5.6 times growth for Hungary, 2.8 times growth for Poland, 14% growth for Portugal while Romania is the only Member State from this analysis with a decrease, sitting at 14%.

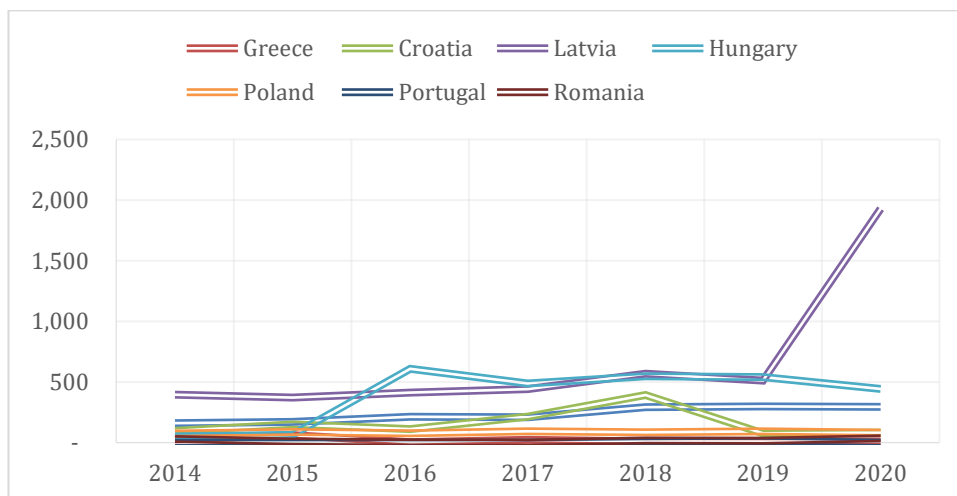


Figure 5. Processing of crops (€/farm)

Source: Agridata (AG, 2022b)

As presented in the above figure most of the countries stick to a relative constant trend beside Latvia and Hungary, they both sit at more than 3 times of an increase in 2020 as compared to 2014. Greece and Croatia recorded negative growth in 2020 vs 2014. Poland recorded a 9% growth in 2020 as compared to 2014 while Romania recorded a 20% increase.

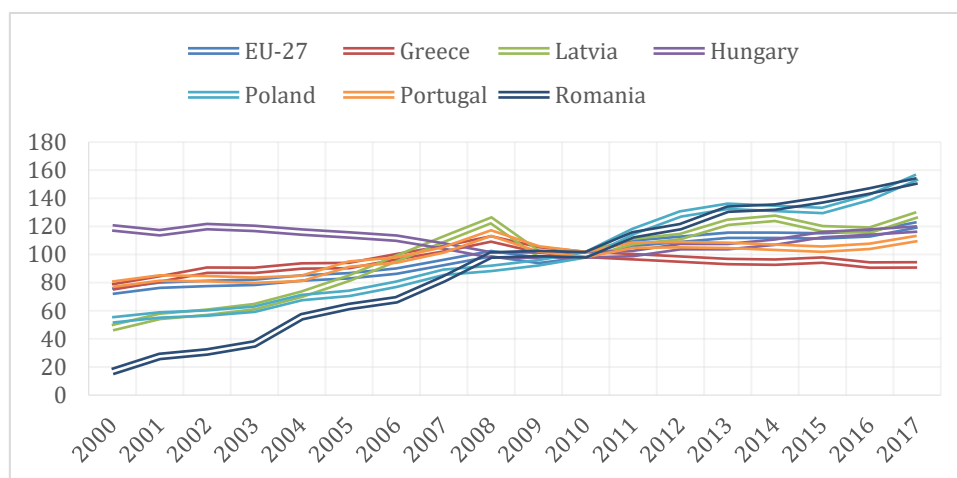


Figure 6. Turnover in Manufacture of food products industry (% comparison to 2010)

Source: Eurostat (Eurostat, 2022b)

As seen in the above figure, the manufacturing turnover has recorded an ascending trend where 2010 is the comparison value. The European Union's yearly growth sits at 3%. The Member States below the European average growth are Portugal (2.2%), Greece (1.2%) and Hungary (0%). The largest yearly increase has been recorded in Romania (15%), followed by Poland (6.6%) and Latvia (6.4%).

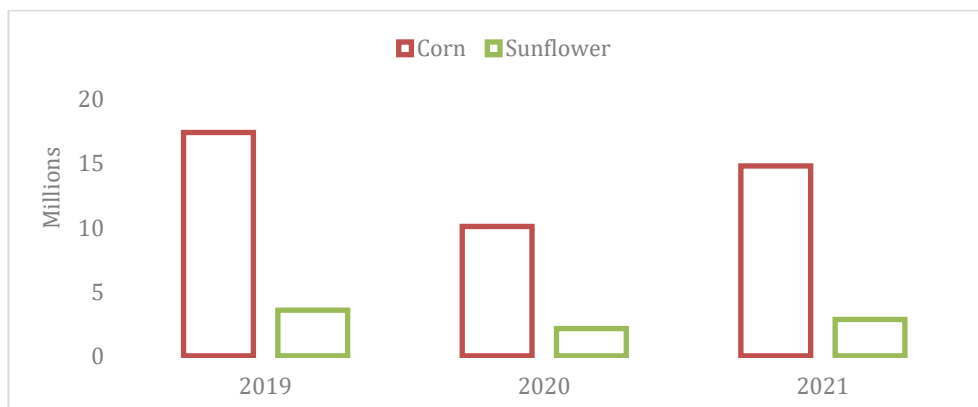


Figure 7. Cereal production in Romania (T)

Source: Tempo Online

As seen in the figure above, we can see that the corn crop recorded the largest amount. In 2019, it recorded a production of 17.432,223 tons, respectively 14.820,693 tons in 2021.

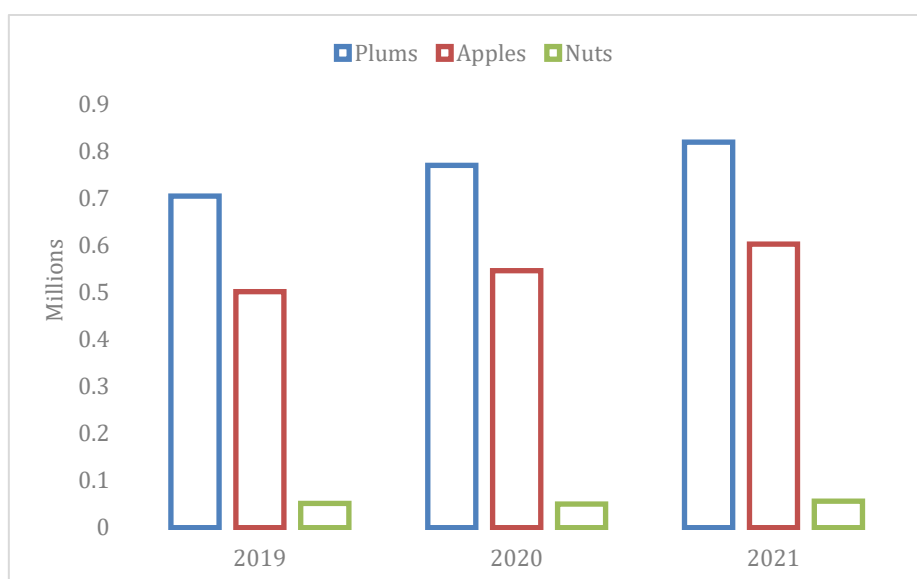


Figure 8. Fruit production in Romania (T)

Source: Tempo Online

As can be seen in the figure above, we can see that during the analyzed period, plum production increased in 2022 (819.358 T) compared to 2019 (704.817 T).

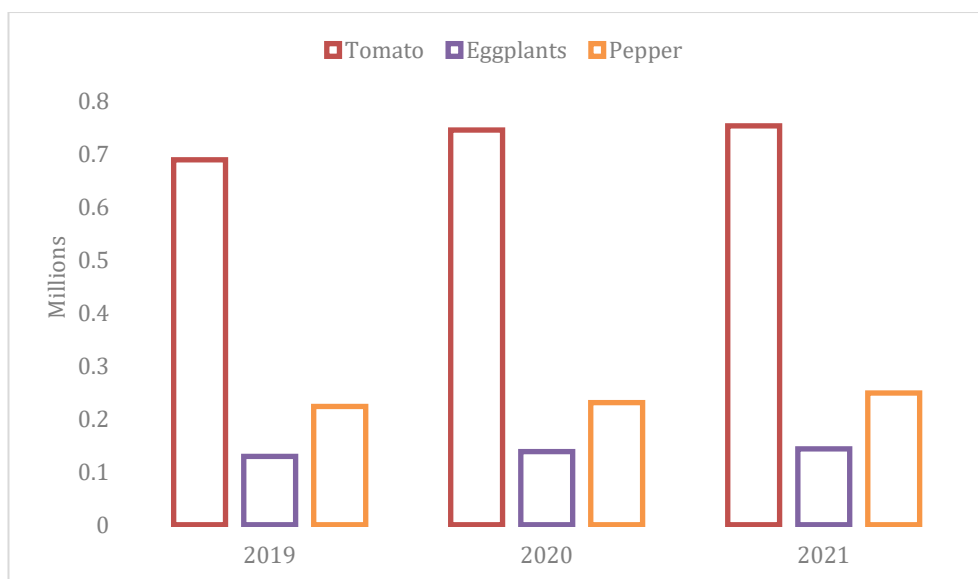


Figure 9. Vegetable production in Romania (T)
Source: Tempo Online

As seen in the figure above, tomatoes recorded the highest production in 2021, along with eggplants and peppers. In the analyzed period, we can see that the three cultures registered a continuous increase in production.

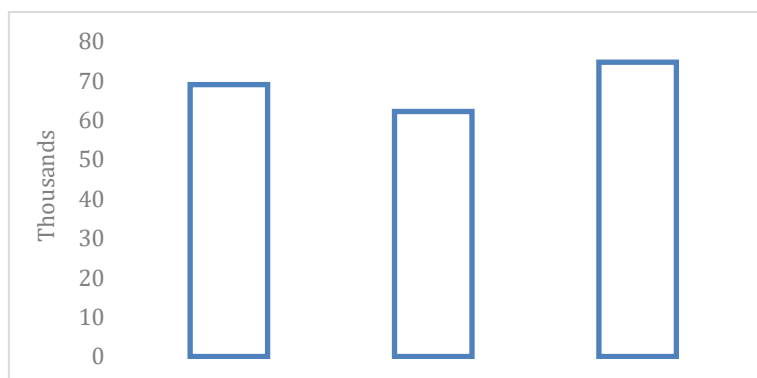


Figure 10. The value of the export of agri-food products in Romania (MIL RON) (2019-2021)
Source: Tempo Online

As can be seen in the figure above, we can see that the export of agri-food products from the analyzed period registered a significant increase in 2021 (74701 MIL RON) compared to 2019 (68998 MIL RON).

Conclusions

Consumers' needs must be considered together with future processing development. New processing technologies should be associated with economic advantage but without tangible benefits for the consumers, the uptake is diminished.

To be able to feed the growing population in a sustainable manner it is required a multi-sectorial approach over the entire food system, where all stakeholders need to be engaged.

Economic development has strongly influenced the normal flow even for the food processing industry. In the current world that is focusing on growth, sometimes it is difficult for this food supply chain actor to achieve growth due to the permanently changing environment.

In the case of the Romanian agricultural value added, what was demonstrated in previous research sections was that latest years met growth, even at significant levels, reaching notable absolute results in comparison with the other countries that have been analyzed.

Agricultural representativeness in GDP has constantly and steadily reduced across all countries analyzed, but the most notable decrease was recorded for Romania.

When overseeing the processing capacity in the animal sector, Romanian farms recorded average figures that peaked in year 2014; while for the crops sector, Romanian farms are sitting at the lowest values within the analyzed group.

Another important fact is that Romanian manufacturers of the food industry have also recorded remarkable figures, above the study's population and even matching EU-average.

The paper focused on providing a brief description of this important sector of the food industry and highlighted some of the strengths and weakness of the Romanian sector, in comparison with other EU Member States such as Poland, Portugal, Latvia, Greece and Hungary.

References

1. Agridata (AG), 2022a. (SE705) Processing of animals and animals' products, accessed 27.10.2022, available at: <https://agridata.ec.europa.eu/extensions/DataPortal/home.html>
2. Agridata (AG), 2022b. (SE710) Processing of crops, accessed 27.10.2022, available at: <https://agridata.ec.europa.eu/extensions/DataPortal/home.html>
3. Augustin, Mary Ann & Riley, Malcolm & Stockmann, Regine & Bennett, Louise & Kahl, Andreas & Lockett, Trevor & Osmond-McLeod, Megan & Sanguansri, Peerasak & Zajac, Ian & Phd, Lynne. (2016). Role of food processing in food and nutrition security. *Trends in Food Science & Technology*. 56. 10.1016/j.tifs.2016.08.005.
4. Boekel, Martinus & Fogliano, Vincenzo & Pellegrini, Nicoletta & Stanton, Catherine & Scholz, Gabriele & Lalljie, Sam & Somoza, Veronika & Knorr, Dietrich & Jasti, Pratima & Eisenbrand, Gerhard. (2010). A review on the beneficial aspects of food processing. *Molecular nutrition & food research*. 54. 1215-47. 10.1002/mnfr.200900608.
5. Chemat, Farid & Rombaut, Natacha & Meullemiestre, Alice & Turk, Mohammad & Perino, Sandrine & Fabiano-Tixier, Anne-Sylvie & Vian, Maryline. (2017). Review of Green Food Processing techniques. Preservation, transformation, and extraction. *Innovative Food Science & Emerging Technologies*. 41. 10.1016/j.ifset.2017.04.016.
6. Cox, D. N., Evans, G., & Lease, H. J. (2011). The influence of product attributes, consumer attitudes and characteristics on the acceptance of: (1) Novel bread and milk, and dietary supplements and (2) fish and novel meats as dietary vehicles of long chain omega 3 fatty acids. *Food Quality and Preference*, 22(2), 205-212.
7. Eurostat, 2022a. Gross value added of the agricultural industry - basic and producer prices, accessed 27.10.2022, available at: <https://data.europa.eu/data/datasets/bwzxcrbwhsymehubjzmz6mw?locale=en>

8. Eurostat, 2022b. Turnover in industry, accessed 27.10.2022, available at: <https://data.europa.eu/data/datasets/9xj4wn7cj5gipcddfochuq?locale=en>
9. Jaeger, H., Knorr, D., Szabó, E., Hámori, J., & Bánáti, D. (2015). Impact of terminology on consumer acceptance of emerging technologies through the example of PEF technology. *Innovative Food Science & Emerging Technologies*, 29, 87-93.
10. Jill K. Clark, Becca B.R. Jablonski, Shoshanah Inwood, Aiden Irish & Julia Freedgood (2021) A contemporary concept of the value(s)-added food and agriculture sector and rural development, *Community Development*, 52:2, 186-204, DOI: 10.1080/15575330.2020.1854804
11. Knorr, Dietrich & Augustin, Mary Ann. (2020). Food processing needs, advantages and misconceptions. *Trends in Food Science & Technology*. 108. 10.1016/j.tifs.2020.11.026.
12. van Grinsven, H.J., Erisman, J.W., de Vries, W., & Westhoek, H. (2015). Potential of extensification of European agriculture for a more sustainable food system, focusing on nitrogen. *Environmental Research Letters*, 10.
13. The World Bank (WB), 2022a. GDP/Capita calculation, accessed 27.10.2022, available at: <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>
14. The World Bank (WB), 2022b. Agriculture, forestry, and fishing, value added (% of GDP), accessed 27.10.2022, available at: <https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS>