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Situation and development trends of the food industry

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1. SUMMARY

The food industry in Hungary has come a long way from the 1800s to the present day and is still facing many challenges. It is a highly heterogeneous sector with a large number of employees, whose uniqueness and specificities have a significant impact on its present and potential. Its development potential lies in increasing added value, moving towards quality products, and positioning itself on domestic and export markets. The pace of development is determined by strategies, subsidies, the regulatory environment, R&D&I opportunities, consumer needs and related education, the availability and variability of raw materials, strict food safety requirements, etc.

In this article, we present the past, present and development trends of the food industry based on the lecture 100+10 years of food science at the 240th anniversary of the Budapest University of Technology on 19 November 2021.

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2. Brief history of the food industry

2.1. A brief history of the food industry up to privatisation

Industrial food production is worth talking about from the period after the reconciliation (1867). In general, industry, including the food industry, underwent significant development in the second half of the 19th century. At the beginning of the 20th century (1913), the food industry employed 15 per cent of the total workforce, while its contribution to the value of production was close to 40 per cent. The sugar industry and the milling industry were given a boost, and, combined with the also prospering machinery industry, these sectors were characterised by world-class technology in Hungary. The changes up to the First World War were marked by the emergence of factories built with foreign capital and the development of a food industry linked to large estates. The further development of the sector was strongly influenced (some of whose effects are still felt today) by the development of infrastructure (Budapest is the centre of the sector), the presence of foreign capital, and the modernisation of domestic trade and credit.

After the First World War, a dual structural development started, with almost 80 per cent of production being carried out to European standards using large-scale industrial methods, and the rest in technically highly heterogeneous small-scale plants. The export orientation of large firms was already evident, while small firms concentrated primarily on local supply. The food industry at the time was characterised by a desire for an optimum combination of different production processes, for example, a distillery processing by-products were added to a canning plant, and the steam from sugar factories was used not only for concentrating sugar beet juice but also for producing tomato concentrate. By the end of the 1930s, in addition to the traditional Hungarian export product (wine), there were already well-known and respected brands such as Hertz, Pick, Zwack Unicum and Arany Fácán - also good exports, especially to Western European markets.

The agrarian reform of 1945 fundamentally broke down the large landed estate system, creating an agrarian structure that limited the realisation of modern production. However, unity of land ownership and land use was achieved. The attempted Soviet model forced collectivisation in the 1950s which was not successful, and a domestic version was developed. The 1960s saw the gradual emergence of the Hungarian agricultural model, with the modernisation of agriculture and expansion of production.

The food industry, which evolved between 1945 and 1968, was characterised by fundamental peculiarities:

- Recovered from the war damage, production exceeded the pre-war level already in 1949, and by 1960 it had doubled: in 1959 the food industry's production value totalled HUF 19.6 billion, accounting for about 22 per cent of the total industrial production. In 1959, the canned fruit industry produced 53 578 t of canned fruit, the meat industry 179 834 t of raw meat and 35 246 t of fat, the poultry industry 21 452 t of poultry carcasses and 432 million eggs, the dairy industry 2 512 000 hl of drinking milk, 16 531 t of butter, 13 732 t of cheese and the sugar industry 320 890 t of sugar;
- Private ownership was abolished and state ownership dominated large socialist factories were set up, producing partly semi-finished foodstuffs and partly food preparations;
- Autonomy of enterprise management was abolished and planned management was introduced;
- The volume of production increased;
- New technologies were created, giving rise to new specialised sectors;
- A scientific base for product and production development in the food industry was established in the form of a network of research institutes organised by sector.

The period 1969-1991 was characterised by the following developments in the Hungarian food industry:

- The production quality of Hungarian agriculture has increased significantly;
- The Soviet Union was facing a persistent food shortage, so it took the initiative to specialise production, i.e. through bilateral interstate institutions a permanent market was provided for Hungarian products;
- The economic objective was to improve living standards and increase domestic food consumption;
- A change in the system of economic governance, which increased the autonomy of enterprises, although the central budget also diverted and redistributed the results;
- Until the mid-1980s, the volume of food production increased steadily, with a surplus of 35-40 per cent
 produced for export (with state subsidies). The continuous growth of the food industry until 1980 was
 not economically sound, and the lack of financial basis for development was accompanied by a lack of
 quality development. The possibilities for the extensive development of the Hungarian food industry were
 exhausted by the end of the 1980s.

2.2. From the privatisation of the food industry

The economic and social changes of the late 1980s and early 1990s shook the food industry to its foundations. Production levels fell by 10-15 years. The main problem was that many companies had not been exposed to market developments and the need to adapt to them. The main problems arose from the illusion of inefficient, quantity-centred production and seemingly secure markets due to the requirements of planned management.

The privatisation process involved both professional and financial investors. Since the profitability of the Hungarian food industry was low, it was mainly professional investors who were interested. In those sectors where there was a secure domestic market, simple production technology or easy to automate the operations, or a secure supply of raw materials, it was easy to privatise, while there were few investors in, for example, the canning industry, which was based on the Soviet market, or the already highly competitive baking industry. Privatisation has completely transformed the ownership structure of the food industry, with state assets being completely reduced and replaced by foreign capital. The number of people employed began to fall significantly because:

- The newly created companies were no longer bound by the employment obligation;
- In some sectors, the volume of production has fallen substantially, and with it the demand for labour;
- There was also less demand for manual labour in automated sectors (confectionery, beer, sugar, oil, tobacco);
- Some activities (maintenance, catering, security, etc.) were "outsourced".

Following the privatisation period, the food industry has steadily declined in importance, with output as a share of the national economy as a whole falling from 12.5 per cent in 1992 to less than 9 per cent in 2003. A similar trend can be observed in the size of the turnover of products sold by the food industry. The number of people employed in the food industry has also been steadily declining, from employing nearly 9 per cent of the national economy in the early 1990s to 5.8 per cent in 2003. The largest employing sectors were baking, meat processing, poultry processing and dairy products.

The period under review was characterised by a fragmentation of food businesses, with a steady decline in the number of farms and a parallel steady increase in the number of holdings. The reasons for this were the disappearance and restructuring of the 'socialist large enterprises', the adaptation of the newly created enterprises to market conditions and the pursuit of economies of scale.

The performance, mechanisation and export orientation of the food industry is determined by the ownership of the firms concerned. The dominant components are foreign capital, state ownership and the ownership of domestic joint ventures and their development. Depending on the year, these three factors accounted for 80-90 per cent of the registered capital. State ownership has declined from nearly 45 per cent to a few per cent and is now almost negligible. In contrast, the share of foreign capital and domestic partnerships has been steadily increasing. In 1992, foreign capital accounted for 31.7 per cent of registered capital, in 1995 it exceeded 50 per cent, and in 1997 it was as high as 60 per cent. Then the decline started, and was particularly steep after 2002 [1].

2.3. The current situation

The food industry is a highly populated and heterogeneous sector, with more than 4,000 enterprises producing in 33 different sectors. The sector is characterised by a dual structure dating back to the 1800s, with a mix of micro and small companies, which are involved in local supply and filling niche markets, and medium and large companies, which are able to produce homogeneous and large quantities of products, which can be sold in retail chains and exported.

The number of companies and employment in the sector has been steadily declining in recent years, while efficiency has been increasing, with total sector turnover exceeding HUF 4,000 billion and food industry profits increasing several-fold. The sector's products play an important role, with domestic consumers spending 30 per cent of their income on food products and foreign markets are also important, with more than a third of the sector's revenue coming from export sales. The positive shift in the sector's performance and results is a promising trend, but it has mainly been able to grow relative to itself, lagging behind other manufacturing sectors and the international food industry.

For an industry to be successful, it needs to be able to compete in both domestic and international markets. This requires knowledge of the specificities of the area and targeted interventions and development. The food industry, despite being part of the manufacturing sector, has very different characteristics from other sectors. As an integral part of the agricultural sector, it is difficult to understand it in isolation and it is therefore worth analysing and studying the whole food chain.

It has a close symbiotic relationship with agriculture through its demand for raw materials and is also influenced by the performance of other industries (packaging, additives, etc.). The sector is confronted with both domestic and international expectations. For example, in Hungary, there is a clear demand from consumers for a wide range of quality products, preferably domestic, which is also supported by the need for operators to generate higher added value and improve operational efficiency - which also encourages exportability. At the international level, it is the EU expectations, currently mainly the evolving elements of the Farm to Fork Strategy-F2F, which will influence the competitiveness and international opportunities of the industry in the long term. In addition, the regulatory and funding environment, the results of science education and the presence of public authorities are also driving activity horizontally along the whole chain [2].

2.4. International context - F2F

On 20 May 2020, the Commission's Communication on a *Farm to Fork* (F2F) strategy to guide the transition to a sustainable food system was published as part of the European Green Deal. The European Green Deal and the *"Farm to Fork"* strategy address many dimensions of the food system, from animal husbandry and crop production to food labelling and international trade.

Aim of the F2F strategy is to make food systems more sustainable by reducing negative impacts on the environment.

In order to enable consumers to make responsible choices for 'healthy' and sustainable food, the Commission has set the objective of harmonised mandatory introduction of Front of Pack Nutritional Labelling (FOPNL) and proposes to extend the origin labelling requirements, taking full account of the impact on the single market.

To improve the EU food environment and promote the shift to a "healthier" diet, the Commission will also continue to develop nutrient profiles that limit the promotion of foods high in fat, sugar and salt through nutrition or health claims.

In order to achieve the objectives set out in the strategy, appropriate instruments, support and regulation are needed to avoid competitive disadvantages [3].

2.5. Situation in Hungary

The ever-increasing efficiency and effectiveness of the food industry is an ongoing trend. Not only in nominal terms, but also in real terms.

Indicator	Time period	Amount	2010	2021	2010- 2021 (%)
Total sales	January-November	HUF billion	1876	4017	214.1%
Export sales	January-November	HUF billion	592	1721	290.7%
Productivity (production value per person employed)	January-October	HUF/person at current price	17.1	37.1	216.8%
Productivity (production value per person employed)	January-October	HUF/person at unchanged prices	17.1	24.1	140.9%

Table 1. Hungarian food industry in numbers 2010-2021

Even with the difficulties and constraints experienced during the first waves of COVID, the sector managed to grow - due to export sales *Table 1*. Around one fifth of the companies are engaged in export activities, typically medium and large companies, which is why 80 per cent of employment and more than 90 per cent of total sector turnover is attributable to these firms. A secure export base is generated by those sectors where processing can be based on high-quality domestic raw materials. These are the ones that have also contributed significantly to the value of production: meat, dairy and fruit and vegetable processing are the most affected.

However, different sectors have different feedstock situations, income levels, ownership structures and performances:

Food industry earnings have grown dynamically in recent years, but are still below the national average.
Within the industry, there is considerable variation: there are some sectors where the average salary is
around HUF 200 000 gross and others (mainly in highly mechanised areas) where it exceeds HUF 600 000
gross per month (*Figure 1*);

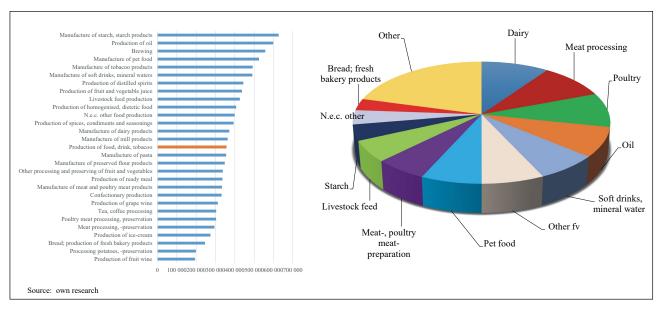


Figure 1. Food industry sectoral wage breakdown

- The manufacturing sector includes nearly 25 thousand enterprises, of which nearly 4 thousand are in the food industry. As in previous years, micro and small enterprises dominate in terms of numbers, together accounting for more than 90 per cent of enterprises, while medium and large enterprises are the most important in terms of the sector's operation. These two groups account for less than 10 per cent of total turnover (although their share is increasing as the number of micro-enterprises declines), but they still account for more than 80 per cent of total domestic turnover and more than 90 per cent of export turnover in 2020, and therefore the vast majority of food industry profits. They provide employment for more than 70 per cent of the sector's workers and concentrate nearly 80 per cent of the sector's wealth;
- The presence of foreign capital is important in the sector, although 91 per cent of enterprises are 100 per cent domestically owned. Foreign capital is prevalent in medium and large enterprises, so these capacities should be taken into account for exports and for the production of homogeneous and large quantities of commodities. Given the different corporate cultures, the direction and characteristics of sales, and the propensity to innovate, these should be taken into account when designing regulations and support schemes.

3. Tools

3.1. Support for the food industry

Support for the food industry is complex. For the period 2014-2020, which closed at the end of 2020, the sector benefited from both operational programmes and domestic funding. Businesses have different opportunities depending on their size (e.g. EU funding for large companies is minimal and limited) and the type of product they produce (annex, non-annex products).

3.1.1. Nationally funded grants 2014-2020:

• The Large Business Investment Support (LBIS) programme, coordinated by the Ministry of Finance, was created to support investments by large domestic companies with a capital shortage and by small and medium-sized enterprises of the size of large companies that are likely to be affected by the planned investment and which make a significant contribution to the growth and modernisation of the Hungarian economy, including the manufacturing and construction industries. The scheme was launched in 2015 and has been active in the food sector every year;

- The Investment Promotion Earmarking (IPE), operated by the Ministry of Foreign Affairs and Trade (MFAT), aims to support projects that improve the competitiveness of the Hungarian economy and attract working capital to create jobs;
- To offset the economic impact of the coronavirus epidemic:
 - As part of the Economic Protection Action Plan, the National Food Economy Crisis Management Programme (NFECMP), which was developed by the Ministry of Agriculture as part of the HUF 8 billion budget, 1457 food processing enterprises received nearly HUF 6.8 billion in aid;
 - The Competitiveness Enhancement Support Programme (CESP), announced by the MFAT and implemented by National Investment Agency Nonprofit Ltd. of the HIPA.

3.1.2. Operational programmes grants:

- Under the Economic Development and Innovation Operational Programme (EDIOP), food companies
 could apply for a number of grants, such as for technological innovation, employment promotion,
 efficiency gains, higher value-added products, capacity expansion or R&D;
- The Rural Development Programme (RDP) is open to micro and small enterprises other than farmers producing annex products and to farmers. Dedicated calls for proposals have helped operators in the sector to access resources;
- Almost three quarters of the aid comes from RDP and EDIOP sources, but the aid values for the large business sector (LBIS), which is only moderately eligible for EU funds, and the export promotion scheme (IPE), which typically targets medium-sized and large companies, are also relevant for the sector.

Double target of the 2021-2027 resource planning:

- Recapture domestic markets;
- Enhancing export capacity.

It also comes with a financial resource.

In the 2014-2020 funding period, the sector has been granted more than HUF 468 billion in national and EU funding. This was an outstanding amount compared to previous years and could also help the sector to put viable businesses on a growth path. The current (2021-2027) funding period plans to provide even more resources, with HUF 750 billion from the Rural Development Program alone earmarked for food sector development. After several rounds of consultation with industry players and stakeholders, the following intervention points have emerged for the planning of development directions:

- More efficient and profitable production structures can be created through the preference for robotisation and modernisation, and the domestic production of higher value-added products can change the structure of export-import favourably;
- Industrial development makes sense if there is consumer demand for the products produced. To achieve this, it is important that consumers are well informed and aware, but this requires awareness campaigns or brands to guide their choices:
- In addition, it is essential to increase resource efficiency, reduce the environmental burden, and include labour and skills in the preferences.

Unlike in previous support periods, for 2021-2027, support for the food industry will be concentrated in one place and coordinated. Due to a high share of national funding, two dedicated funds for the sector were opened in 2021, a small-scale capital equipment purchase and a HUF 320 billion fund for complex developments, with up to HUF 5 billion in non-repayable grants. The feed sector was excluded from previous calls, but as it is part of the food industry and is a sub-sector typically based on domestic raw materials with a significant export value, a separate call was made for it.

In addition to these, there are also calls for farmers and the food industry, which provide opportunities for development through a specific sub-area. This is the case, for example, for calls relating to quality schemes. Products produced under quality schemes are of a higher quality than other similar products that meet the minimum requirements of the legislation. The aim of the quality schemes is to help ensure that products produced under quality schemes recognised by the European Union and Hungary are known and recognised by consumers and can be marketed more effectively by producers. In addition to the products associated with the protected designations, there is currently one quality scheme in Hungary, the *High Quality Food Trademark Scheme*, which is nationally recognised and notified by the EU.

As with the two calls already launched in 2021, we plan to repeat these in 2023 and 2025, possibly adapting the calls in the light of experience gained. The aim is to produce higher value-added products, have more profitable and efficient food companies, increase exportability and reduce imports.

3.2. Recent issues

3.2.1. Codex Alimentarius Hungaricus

Our main aim in developing the industry is to ensure high-quality food, while at the same time reducing the market for poor, low-quality food. The Codex Alimentarius Hungaricus is a reliable source of information for consumer awareness and responsibility. One of its main aims is to provide guidance, both to producers and to consumers, but this is also an effective way of ensuring the smooth flow of international trade, fair competition in the market and the enforcement of national specificities. Therefore, our priority is to continuously review and amend the regulations and directives of the Codex Alimentarius Hungaricus.

On the basis of the previous practical experience of the Codex Alimentarius Hungaricus Committee and its Committees and the suggestions of the food industry, it was justified to change the composition of the Board in such a way that food businesses are better represented, taking into account the operational efficiency of the Board. As a result, the functioning and composition of the Codex Alimentarius Hungaricus Committee and its Committees have been changed, making the work more transparent and streamlined, and giving greater weight to the presence of industry. From a professional point of view, the new regulations have been developed with a focus on high quality.

The 2010s brought significant changes in the regulation of meat products and bakery products, this year brought the renewal of the dairy regulation, but further changes are underway for meat products and a comprehensive revision for quick-frozen fruit and vegetables.

3.2.2. Digital Strategy for Food

The food industry is the first largest sector in terms of production value in Europe and the third largest in Hungary. It also plays a major role in employment and it is a significant user of agricultural resources. Therefore, increasing productivity and efficiency in the food industry is of utmost importance, and Industry 4.0 and the application of digitalisation offer many new opportunities. This will lead to new products, new services, new solutions and approaches through more efficient use of resources, improved quality parameters, and new skills and competencies. All this could even improve the international competitiveness of domestically produced food.

In 2019, the Digital Food Strategy was launched, with inter-ministerial collaboration, academic and other scientific workshops, stakeholders and professional organisations. A general assessment of the current digital situation in the sector has been carried out and intervention points and lines of action have been identified. Their impact will be measured in the coming years, adopted in November 2022.

3.3. Other issues (research, horizontal regulations, sub-areas)

3.3.1. Regulation, origin, Hungarian product

Food labelling is a complex area that includes, in addition to the information on food packaging, the advertising, packaging, presentation and display of food products. The role of food labelling is to provide the consumer with objective, accurate and truthful information about the product.

The issue of origin labelling is becoming increasingly prominent, as shown by the increasing number of laws on mandatory and voluntary origin labelling in the EU harmonised food legislation and in the Member States' regulations over the last 20 years.

For a number of foods (e.g. beef, veal, fish, fruit and vegetables, honey, olive oil, etc.) origin labelling is mandatory, while in other cases origin labelling is mandatory where failure to indicate it would mislead consumers or where the country of origin of the food is indicated but the origin of the primary ingredient is different from this information. The determination of origin for food labelling purposes is done through product-specific rules or, in the absence thereof, horizontal rules.

The rules on the origin labelling of foodstuffs are in some cases closely intertwined with those laid down in the EU Customs Code [4].

In Hungary, voluntary labelling legistlation is in force as defined in the Vm Decree No.74/2012 (25.VII.) of the Rural Development on the use of certain voluntary (hereinafter: MRD Decree), which defines the terms "Hungarian product", "domestic product" and "product processed domestically" and the related requirements, but does not impose the obligation to use a trademark or logo.

These three categories provide the consumer with information on whether the product originates exclusively or partially in Hungary or whether it has been processed in Hungary. The MRD Decree also regulates claims referring to the above-average quality or specific quality characteristics of a product [5].

National and international research shows that origin information is one of the most sought-after labelling elements by consumers. According to a survey of the Hungarian population conducted by the National Food Chain Safety Office, 82.12% of respondents pay attention to the origin of Hungarian food products, 56.32% of whom take the origin of the product into account before making a decision, 25.80% of whom only buy certain products, and 17.88% of the adult population do not care about the origin of the product [6].

3.3.2. Front of Pack Nutritional Labelling - FOPNL

According to Regulation (EU) No 1169/2011 of the European Parlaiment and of the Council on the provision of food information to consumers (hereinafter: Labelling Regulation), nutrition labelling (energy, fat, saturates, carbohydrates, sugars, protein, salt) is generally mandatory for the vast majority of pre-packaged foods from 13.12.2016, in order to enable consumers to make an informed and health-conscious choice. The mandatory nutrition labelling is usually on the back of the food packaging. Under the Labelling Regulation, certain elements of the nutrition labelling may be repeated in the principal field of vision in one of two ways: a.) energy or b.) energy and fat, saturated fatty acid, sugar, and salt.

The Labelling Regulation allows the use of graphical forms and symbols in addition to the mandatory presentation. The main purpose of such schemes is to help consumers towards a healthier diet [7, 8].

The voluntary FOPNL on the front of packs is not harmonised at the EU level, so there are several such labelling schemes on the EU market [8], with different forms of presentation and different purposes, and therefore not comparable, as they are based on completely different principles.

Nowadays, FOPNL nutrition labelling has been the subject of continuous and constant interest at the national, EU and global level. As nutritional science evolves year by year, there is a need for legislation to adapt to these changes.

The FOPNL nutrition labelling is a complex and sensitive area, so it is important to see how the systems used in different Member States (e.g. in order to achieve these objectives, a study by the Food Economics and Quality Policy Department of the Ministry of Agriculture, using 800 products within 8 product categories, has examined the potential impact of the introduction of FOP schemes in EU Member States on the domestic food industry and on typical domestic products.

The survey showed that the **NutrInform Battery** can be considered balanced and objective for Hungarian products, as it provides consumers with a numerical indication of how much energy, fat, saturated fat, sugar and salt a serving of a product provides compared to the daily reference intake. **Keyhole** would not be strongly discriminatory, given that it only uses positive discrimination. There is a significant risk of introducing **Nutri-Score**, given the negative discrimination caused by the colours and categories. It classifies a number of traditional Hungarian products in categories E, D, C, including those with a single portion of less than 100 g as a basis for assessment.

3.3.3. Food Substitutions

The Food Economy and Quality Policy Department of the Ministry of Agriculture has carried out a representative consumer survey to examine whether consumers can clearly distinguish between the original and substitute products in the product range of milk, cream, yoghurt, butter, milk powder, cheese, stuffed meat products and meat patties and whether the current legislation regulates imitations adequately or whether amendments are needed. The research has shown that in some product categories there is an insufficient distinction between traditional and imitation products, and that the appearance and naming of products can often be misleading. Some products may have product names that are not in line with legislation and regulations and may use inappropriate graphic elements.

3.3.4. GHP- Good Hygiene Practice

Good practice guides, which food business operators use on a voluntary basis, play an important role in EU food safety legislation. Microbiological rules have changed frequently in recent years. The individual industry guides deal with microbiological requirements in broad general terms, but there is a need for a detailed summary of the subject, with a common set of requirements for microbial testing and subsequent procedures, and therefore a guide for food businesses has been developed.

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