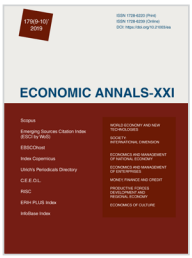

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Food industry in EU: testing the efficiency of business on the example of Hungary

Abstract
The food industry is a sector of particular importance in the Hungarian economy. Besides the fact that its contribution to the national economic output is 4.6-5.0%, it is the largest market outlet for agricultural raw materials. Today's economic environment is constantly changing, and competitiveness can only be preserved with regard to efficient production. It is indispensable for the enterprises to know with which factors they can make their production more efficient, and which are the ones that can be improved in efficiency.
In our study, we present the production and some typical indicators of the food sector in the European Union and Hungary. Our specific investigations are focused on the effectiveness of the dual-accounting food businesses. After determining each of the yield indicators (gross production value, material-free production value, net production value, added value), complex and partial efficiency indicators have been calculated and analyzed.
Between 2013 and 2017, the yield indicators of the examined food businesses were increasing year by year despite the significant reduction in the number of enterprises by 2017 (fresher statistics currently available in Hungary). The complex efficiency indicator has been declining since 2016 which is caused by extremely high committed asset values and insufficient utilization of resources. The change in the yield indicators was followed by the change in the partial efficiency indicators. In many cases, the projection funds decreased during the period under review.
Keywords: Food Industry; Gross Production Value; Net Production Value; Added Value; Complex Efficiency; Partial Efficiency; Hungary
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Харчова промисловість в ЄС: оцінка ефективності ведення бізнесу на прикладі Угорщини
Анотація
Харчова промисловість відіграє особливо важливу роль в економіці Угорщини. Окрім того, що внесок даної промисловості в національне виробництво становить 4,6-5,0%, це ще й найбільший ринок збуту сільськогосподарської сировини. Економічна кон'юнктура зазнає постійних змін, у зв'язку з чим конкурентоспроможність на ринку може бути збережена тільки за умови дотримання ефективності виробництва. Підприємствам необхідно знати, завдяки яким факторам вони можуть підвищити ефективність свого виробництва. У статті розглянуто типові показники секторів харчової промисловості

Європейського Союзу та Угорщини. В основу проведеного авторами статті дослідження покладено статистичні дані підприємств харчової промисловості з подвійною підзвітністю. Після визначення показника прибутковості (валової собівартості, собівартості без урахування витратних матеріалів, чистої собівартості та доданої собівартості) було розраховано та проаналізовано комплексні й часткові показники ефективності.
Було виявлено, що в період з 2013 до 2017 року спостерігалося зростання показників прибутковості підприємств харчової промисловості, незважаючи на значне скорочення їх числа станом на 2017 рік. У той же час спостерігалося зниження комплексного показника ефективності, починаючи з 2016 року, що обумовлено надзвичайно високою вартістю активів і недостатнім використанням ресурсів. Зміна показників прибутковості спричинила зміну показників часткової ефективності, що переважно пов'язано зі скороченням виробничих витрат протягом аналізованого періоду.
Ключові слова: харчова промисловість; валова вартість виробництва; чиста вартість виробництва; додана вартість; комплексна ефективність; часткова ефективність; виробничі витрати; Угорщина.

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Пищевая промышленность в ЕС: оценка эффективности ведения бизнеса на примере Венгрии
Аннотация
Пищевая промышленность играет особо важную роль в венгерской экономике. Помимо того, что вклад данной промышленности в национальное производство составляет 4,6-5,0%, это еще и крупнейший рынок сбыта сельскохозяйственного сырья. Экономическая конъюнктура претерпевает постоянные изменения, в связи с чем конкурентоспособность на рынке может быть сохранена только при условии соблюдения эффективности производства. Предприятиям необходимо знать, благодаря каким факторам они могут повысить эффективность своего производства. В данной статье рассмотрены типичные показатели сектора пищевой промышленности Европейского Союза и Венгрии. В основу проведенного авторами статьи исследования положены статистические данные предприятий пищевой промышленности с двойной подотчетностью. После определения каждого показателя доходности (валовой себестоимости, себестоимости без учета расходных материалов, чистой себестоимости и добавленной себестоимости) были рассчитаны и проанализированы комплексные и частичные показатели эффективности.
Было выявлено, что в период с 2013 по 2017 годы наблюдался рост показателей доходности предприятий пищевой промышленности, несмотря на значительное сокращение их числа по состоянию на 2017 год. В то же время было отмечено снижение комплексного показателя эффективности, начиная с 2016 года, что обусловлено чрезвычайно высокой стоимостью активов и недостаточным использованием ресурсов. Изменение показателей доходности повлекло за собой изменение показателей частичной эффективности, что во многих случаях связано с сокращением издержек производства на протяжении рассматриваемого периода.
Ключевые слова: пищевая промышленность; валовая стоимость производства; чистая стоимость производства; добавленная стоимость; комплексная эффективность; частичная эффективность; Издержки производства; Венгрия.

1. Introduction

Hungary's moderate climate, the country's excellent soil and the water resources available for the agriculture assure that by using adequate technology and knowledge we cannot only provide the population of Hungary with safe food of high quality, but we are also able to export a significant amount of food to even the more demanding customers of other countries (Ministry of Agriculture of Hungary, 2015).

In compliance with strict food safety regulations, food businesses have to produce food so that they will be able to satisfy the constantly changing customer needs and in the meantime preserve and strengthen their competitiveness. That is why continuous economic analysis, including efficiency is indispensable for businesses. Efficiency can be enhanced by the increase of yield indicators, more efficient utilization of resources and cost reduction. One of the keys to the increase of competitiveness for the businesses is to recognize and to know with which factors they can make their production more efficient (Vásáry et al., 2013).

2. Relevance of raising the issue at food businesses

The food industry is one of the key sectors of the Hungarian economy. Food businesses which are able to constantly renew their production, rapidly adapt to the market and provide the

consumers with reliable products can do much to improve Hungary's competitiveness (Világgazdaság, 2018).

The population of the Earth is increasing by 140 people per minute, so by 2050 world population will have reached 9 billion. Provided that the increase in the population will be accompanied by an increase in the average age, there will also be a further growth in the demand for food. As a result, the demand for food will grow by 60% besides the population increase of 30%. In addition, it is important to expect differentiated consumer demands in the world. Besides mass production, there will also be an increased demand for high-quality food (Hungarian Chamber of Agriculture, 2018).

It is a national security interest to provide the population with safe, good-quality food from domestic sources (Vasa, 2003). It is a priority to promote healthy nutrition from the point of view of the population's health. According to the Atradius analysis of the sector, the performance of food industry could improve by 3-4 percent per year in the next five years. This is still one of the most important sectors of the Hungarian economy, every tenth of the 500 largest national enterprises operate in the food industry. The food industry is the second biggest employer in the field of product manufacturing, and, at the same time, it is the third biggest producer. More than 10 percent of the country's total industrial production is provided by this sector (Store Insider, 2017).

Today, the most important aim of the food industry is first to stop the decrease of production, then to increase it, and thus to contribute to the development of the whole economy to the extent possible, which will finally result in the growth of consumption and employment. From the point of view of business management, efficiency is one of the measures of success of businesses.

Agriculture and the food industry are of significant importance in the provision of the population, the generation of foreign currency and in the employment. Today, the application of the controlling system has an important role in the life of businesses, and efficiency analysis is one of its fields. In compliance with strict food safety regulations, food businesses have to produce food so that they will be able to satisfy the constantly changing customer needs and in the meantime preserve and strengthen their competitiveness. Thus, a continuous economic analysis, including efficiency testing is more important for the businesses. Besides enhancing quality production, cost reduction is the aim of each business, which means increasing efficiency.

Efficiency is always a relative notion. The problem of economic efficiency is closely related to property rights. There is no efficiency in absolute terms. However, in the microeconomics models, it is assumed that the aim of the participants is to maximize profit, as profit is undoubtedly the most important driving force, and at the same time a dominant goal in the market economy (Kopányi, 1993).

In economic terms, efficiency is the expression of the effectiveness of economic management. It is measured by the collation of expenditures and results (Czékus, 2004).

In the case of an efficiency analysis, we are looking for the answer what performance can be achieved by the resources, certain equipment, assets and human resources used and available for the business in the given period. The term of performances means the return on the activities, which shows significant differences depending on the nature of the activity (Bíró et al., 2016).

An activity is considered to be economical if the given result is ensured by smaller expenditure, or by certain expenditure better results can be achieved.

Efficiency is an indicator articulated as a quotient and according to what is in the numerator and the denominator; it has different types. In other words, it is a ratio constituted from the quotient of the results and expenditures of the given activity. It includes the indicators of productivity, resource intensity and endowment and that of the proportionality of income (Nábrádi, 2005).

The yield included in the indicators can be revenue, any production value indicator (this is the most frequent) and yield given with any real values. The resources used can be the average value of any (groups of) assets or liabilities, any (elements of) cost, or resource utilisation given with any real values (for example number of employees) (Koppány & Kovács, 2011).

The primary aim of efficiency testing is to reveal the reserves of the increase of efficiency, and by this to provide guidance on the future tasks. Reserves can be recognised, on the one hand, by international comparison, on the other hand, by the collation of sectors and certain businesses (Felkai et al., 2013).

Efficiency can be interpreted at corporate, sector and national economic levels, and, at the same time, if it is broken down into area or activity levels (Nábrádi, 2008; Szűcs-Farkasné, 2008).

Each level determines the scope of indicators used to test efficiency. At the corporate level, a business characterized by «one input - one output», or in real life a usually more complex business characterized by «more inputs - more outputs», can make it possible to use different solutions.

The indicators used for testing can be classified on the basis of different viewpoints. Thus, concerning the effect of factors, efficiency can be tested with partial indicators (which examine the effect of one input factor on more outputs), or with overall efficiency indicators (which express the combination effect of more input factors of different types) (Tangen, 2002), and with an indicator which denotes the total social efficiency of factors, also taking into account the spill-over effects of production factors (Szűcs & Farkasné Fekete, 2008).

Among the efficiency indicators Nábrádi (2008) makes a difference between physical and economic indicators. The physical indicators apply figures expressed in physical units (in physical dimension) both at the input and the output side. These indicators are indices of the production standard (Gábrielné (2002), for example separates them from the efficiency indicators). According to our interpretation these indicators also enrich the scope of efficiency indicators. In the case of economic indicators, the input and/or output factor is expressed in monetary values, the reason for which is aggregation in many cases.

Kopányi (1997) makes a difference between technical and economic efficiencies. In the case of technical efficiency, the main point is to reach the determined goal with the lowest possible costs. Meanwhile, the operation is economically efficient if the given result is realized with smaller expenditure, or bigger results can be achieved with given expenditures.

In our research, the economic aspect of efficiency is concerned, and in respect of what Kopányi (2004) said it applies to the relationship of input and output as opposed to Nábrádi (2008) according to whom we mean the quotient of any combination of the results and expenditures by efficiency. It must be mentioned here that according to the above described interpretation of economic efficiency which can be interpreted in two ways, Tangen (2002) sets apart the efficiency of the input (efficiency) point-of-view and that of the output (effectiveness) point-of-view. In the case of the former one, the amount of resources to be expected and actually used is compared by a given level of emission, while in the latter case the actual and expected emissions are compared to one another by a given level of resource utilization.

Economic efficiency is the process at the lowest cost, belonging to the completion of the given task, and the process generating the biggest result at given total spending (Dancs & Molnár, 1997).

According to Nábrádi (2005), economic efficiency is expressed as a relation of result and expenditure in the most common way, however it cannot be restricted only to a simple relation of production expenditures and results, but it must also be extended to a wider field of national economy expenditures and results.

If result categories (yield, production value, income) and expenditure categories (resources, expenditure, production cost) are arranged in one chart and if everything is linked together with everything, then such a comprehensive system of indicators will be established, which can be considered as the basis of economic analyses. Depending on the fields of analysis, the most important economic indicators on which the analysis can focus, can be selected. Direct and indirect efficiency indicators have been differentiated (Zs. Nemessályi & Á. Nemessályi, 2003).

By the efficiency of production we mean if the resources cannot be redistributed among businesses in a way to increase the production of a product, the output of another product will decrease (Carlton & Perloff, 2003).

Efficiency rates measure how economically a business uses the assets possessed. It is especially useful in order to evaluate the business results. The management often uses it to evaluate both certain branches of the business and the whole business. One of the main aims of cash fund management is the most favourable distribution of resources among different types of assets. In the case when a preferred combination of cash, receivables, stocks, equipment is available, the efficiency of the asset structure of the business can increase in generating sales. Efficiency ratios show how the resources invested in certain asset types relate to the revenue they have generated. These quotients are also-called the activity rates of businesses (Katits, 2017).

The operational efficiency of the Hungarian factor market can be improved, and by this a significant additional growth can be achieved. It can be effective to employ further layers in the labour market and to decrease the institutional uncertainty concerning investments in the financial market (Filep & Tamándl, 2011; Kónya, 2017).

3. The database under review and the methodology of analysis

The data necessary for our tests result from the balance sheets and income statements of the businesses with double-entry bookkeeping to be found in the annual publication of the Research Institute of Agricultural Economics (AKI) entitled «Az élelmiszer-termelés gazdálkodó szervezeteinek pénzügyi helyzete» (in English: Financial Position of Business Food Production Organizations). We use the latest data available as of the end of 2019. The number of enterprises surveyed by type of pre-tax profit, number of employees, according to legal form and size of the enterprise are included in Table 1.

The main lines of the balance sheet and income statement of businesses are analyzed in Excel. The efficiency indicators and the yield indicators necessary for their definition have been determined by the use of the data. The calculation method is presented in Table 2.

Table 1:
Number of enterprises surveyed by type of pre-tax profit, number of employees, according to legal form and size of the enterprise (2014-2017)

Denomination	2014	2015	2016	2017
Pre-tax profit by nature				
Profitable	3,030	3,036	3,018	2,848
Loss-making	1,914	1,944	1,991	1,772
Break-even	236	218	241	209
Total	**5,180**	**5,198**	**5,250**	**4,829**
According to the number of employees				
0	1,286	1,302	1,445	1,374
1	881	831	820	743
2-9	1,655	1,699	1,675	1,545
10-49	1,023	1,018	962	837
50-249	272	292	295	274
250 people and more	-	56	53	56
Total	**5,180**	**5,198**	**5,250**	**4,829**
According to the legal form				
LLC	4,160	4,184	4,258	3,910
Public limited company	125	128	135	135
Co-operative society	16	190	11	10
Limited partnership	653	634	586	508
Non-profit organization	9	9	12	17
Other	217	53	248	249
Total	**5,180**	**5,198**	**5,250**	**4,829**
According to the size of the enterprises				
Micro enterprise	3,797	3,796	3,901	3,605
Small enterprise	1,015	1,019	966	840
Medium-sized enterprise	279	292	294	279
Large enterprise	-	62	58	60
Other enterprise	89	29	31	45
Total	**5,180**	**5,198**	**5,250**	**4,829**

Source: Compiled by the authors based on data by the Research Institute of Agriculture Economics (2018)

Table 2:
Method of calculating the indicators used

Denomination of the indicator	Method of calculation
Gross production value	Net sales revenues - CoGS - Services sold (provided) + Capitalised value of internally generated assets + / Change in stocks of finished products
Material-free production value	Gross production value - material cost - external charges
Net production value	Material-free production value – depreciation
Added value	Personnel expenses + Depreciation + Profit or loss before tax
Efficiency of labour	yield / number
Efficiency wage	Net production value / Personnel expenses
Efficiency ratio	Net production value / Average net worth of restricted assets
Stock efficiency	Gross production value / Equity
Complex efficiency	Net production value / (0.15 restricted assets + 1.8 payroll expenses)
Partial efficiency ratio	• Net production price per capitalized tangible assets of HUF 100 • Net production value per a stock of HUF 100 • Net production value per all assets of HUF 100
Partial efficiency ratio of labour	• Gross production value per 1 person • Net production value per 1 person • Added value per 1 person
Partial wage efficiency ratio	• Net production value per labour cost of HUF 100 • Net production value per personnel expenses of HUF 100
Cost ratio (cost level)	Production cost / Gross production value
Material ratio	Material expenses / Gross production value
Wages ratio	Personnel expense / Gross production value
Depreciation quota	Depreciation / Gross production value

Source: Compiled by the authors

4. The position of food industry

It is necessary to know the position of the sector and the current market trends in order to be able to analyze the efficiency of food production. The food industry is the largest processing industry in the European Union, considering the gross output, the added value and the number of employees. If the number of businesses is considered, it is the second leading industry sector.

The gross output, the amount of added value and the number of businesses among the food businesses of the European Union was steadily growing between 2013 and 2016. From 2013 to 2014, the number of employees was decreasing, with some growth observed in the following year. In the field of food products, the European Union is a net exporter, with a positive trade balance which was increasing between 2015 and 2016. A similarly growing trend can be observed in the value of the European Union's share in the world's food export (Table 3).

Table 3:
Food industry of the European Union in figures between 2013 and 2016

Denomination	2013	2014	2015	2016
Gross output (EUR billion)	1,090	1,095	1,115	1,109
Added value (EUR billion)	212	219	230	no data
Number of employees (million people)	425	424	451	457
Number of businesses (1000 pieces)	288	289	293	294
Export (EUR billion)	86.2	98.1	102	110
Import (EUR billion)	63.2	72.9	71.9	75.0
Balance (EUR billion)	23.0	25.2	30.1	35.0
EU share from the world's food export (%)	16.1	17.8	17.3	17.9

Source: CIAA (2019)

5. The situation in the Hungarian food industry

«The food industry in Hungary might not have been given such attention as in these days. The government has declared the food processing sector a strategic sector, and the industry sector is treated as a priority strategic field which has definitely become the weakest link in the food chain in the last decades. The strategy has been completed. According to previous press reports, 500 billion forints from different funds would be expended on the development of the sector» (Store Insider, 2014).

In 2005, Antal et al. claimed that the foreign capital invested in the Hungarian food industry had entirely returned to the investors, an amount of 30% higher than the highest invested amount was extracted.

There have been changes both in the food industry and in commerce in the recent years. One of the reasons is the evolving consumer demand. New trends can also be observed in the product range, as private label products have appeared (J. Nagy, 2005).

The output and the gross added value of the Hungarian food industry, like the food industry of the European Union, have been continuously increasing in the period under review. However, the output share in the national economy is characterized by a downward trend. Hungary is also a net exporter in the food market, however the value of imports between 2013 and 2016 was growing faster than the value of the export, thus the positive trade balance was continuously decreasing, then in 2017 it increased again (Table 4).

István Nagy (2019), a minister, said that food businesses could submit their applications to more subsidies of the national source in the subsidy period between 2014-2020, for example the Large Enterprise Investment Programme, or the framework of the Investment Promotion Target and GINOP programmes (Economic Development and Innovation Operational Programmes). The value of subsidies flowing into the food industry since 2014 has now exceeded HUF 300 billion, and they have significantly contributed to the dynamic growth of exports, that is to say to the improving results of the sector (Ministry of Agriculture of Hungary, 2019).

As a result of having the loans with favourable interest terms and national subsidies provided to agribusiness companies, the performance value of investments has been increasing year by year (Table 4).

6. Results

In order to examine efficiency, which shows the evolution of the cost-effectiveness of the activity, we need certain income categories and items of the income statement from which different yield factors can be inferred and calculated. Revenue is one of the important items to be used in an efficiency analysis. The other important yield factor is the production value which is the monetary value of products manufactured by the use of the given resource. In 2001, A. Kozma wrote that the

Table 4:
Important data relating to the food industry of Hungary (2013-2017)

Denomination	2013	2014	2015	2016	2017
Output in current prices (HUF billion)	2,910.1	3,069.5	3,040.3	3,124.7	3,247.6
Within the national economy (%)	5.0	5.0	4.7	4.6	4.6
Gross added value (HUF billion)	536.6	597.6	642.8	647.7	672.2
Within the national economy (%)	2.2	2.3	2.3	2.2	2.2
Export (HUF billion)	1,938.3	1,975.4	2,040.2	2,045.2	2,243.3
Import (HUF billion)	1,123.8	1,242.4	1,309.5	1,400.5	1,537.7
Balance (HUF billion)	814.5	733.0	730.7	644.7	705.6
Performance value of investments (HUF million)	113,667	155,055	129,575	185,660	197,756
of which works (HUF million)	38,393	44,596	37,605	72,342	66,170
of which machinery investments (HUF million)	73,738	108,962	90,506	111,153	130,335
Number of employees (thousand people)	130.2	143.0	140.3	143.8	145.9
Proportion of employees within the national economy (%)	3.3	3.5	3.3	3.3	3.3
Number of workers employed (thousand people)	94.0	96.9	98.2	94.6	95.3

Source: Agrobusiness Statistical Pocketbook 2017 (2018)

production value is the value of manufactured devices and supplied services, calculated at current prices. As in many cases, accumulation can be observed when calculating the production value. More types of production value categories can be determined:

- Gross production value: the value of all the products and services manufactured in one year;
- Cumulative production value: the value of products re-used in production is deducted from the gross production value;
- Commodity production value: the value of the products and services marketed per unit time;
- Added value: the gross production value is decreased by the value of re-use and that of the purchased products;
- Net production value: the value of amortisation is deducted from the added value (Pfau & Posta, 2002).

Efficiency testing was carried out with the help of the above yield indicators. In oder to carry out the efficiency audit of business activities we need indicators which can describe the efficiency of production in diverse ways.

While analysing gross production value, it must be taken into account that its change is not always in direct relation with the change in performance. It also follows that in case the value of materials used for certain products or the composition of production change, production value can also change without any change in the output. The net production value is an indicator reflecting the actual performance of businesses, as it presents approximately the new value established in the period under review, namely how much the contribution of a business to the national income is (Bíró et al., 2010).

Net production value has major importance in the analysis: during efficiency testing this is basically the indicator used in calculations.

The yield factors presented in Figure 1 were steadily increasing in the period between 2013 and 2017. The average rate of development of the certain yield factors was the following:

- Net sales revenue: 2.95%;
- Gross production value: 2.93%;
- Material-free production value: 5.43%;
- Net production value: 5.38%;
- Added value: 8.03%.

It can be seen that the level of the annual average change was the largest in the case of added value. If we compare the changes of gross production value and gross added value, it can be declared that the increase of gross added value significantly outdid the gross production value, which seemed favourable from the point of view of the change of material efficiency.

Efficiency of labour and wages

The efficiency of labour expresses how much yield is the unit of labour (1 person). The number of employees can be compared to any of the yield indicators. The indicator of efficiency of labour is also called the labour productivity indicator. When calculating the indicator, attention must be paid to the fact that besides the number of employees, many other factors have an influence on productivity, for example, the change in the product structure and a different degree of external cooperation. In the period under review, the value of the indicator steadily grew (Table 5). The value of the indicator was the highest in 2017, thus employment is said to be good.

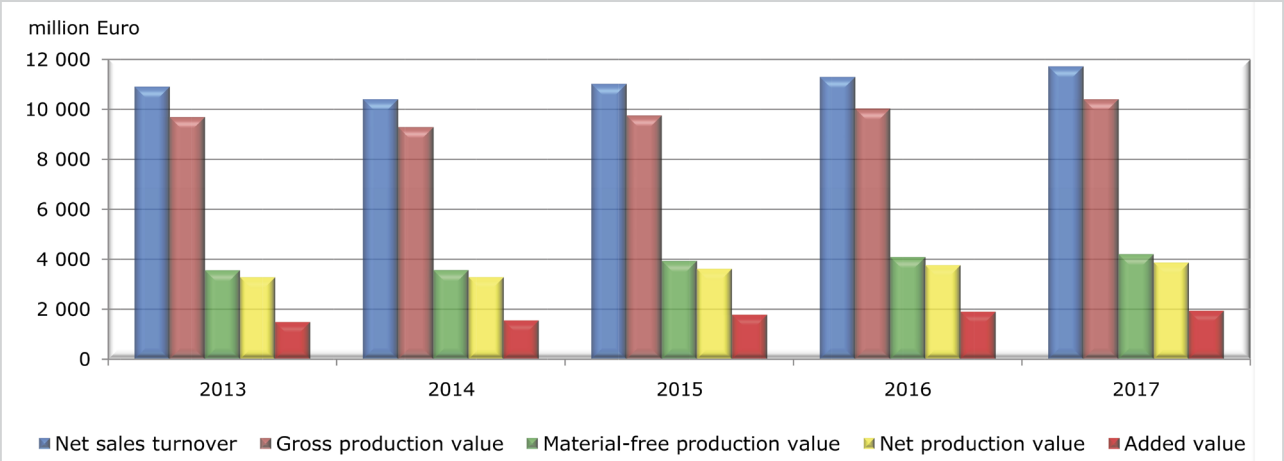

Figure 1:
Development of complex efficiency in Hungary
Source: Compiled by the authors based on the data of the Research Institute of Agricultural Economics from the years 2014-2017

The wage efficiency indicator expresses the ability of the used labour to generate a new value. The net production value is correlated to the labour cost or to personnel expenses. The indicator expresses the ability of the wage moderation of businesses to generate a new value. It is important to analyze it as labour and the costs of used labour that play a fundamental influencing role in the evolution of complex efficiency. The value of the indicator exceeds the value 1, which is of a significant benefit. The reason for the increase in labour costs can be explained by the changes of the number of employees, on the one hand, and the increase of the level of wage levels, on the other hand. As for the costs of labour use, we cannot only mean the wage cost, it can be reasonable to take into account personnel expenses instead of the wage cost when calculating the indicator (Table 5).

Table 5:
Evolution of gross production value per 1 person and wage efficiency in Hungary

Denomination	2013	2014	2015	2016	2017
Evolution of gross production value per 1 person	29.96	29.66	31.58	34.48	36.78
Net production value per labor cost of 1 EURO	4.78	4.82	4.95	4.86	4.61
Net production value per staff expenses of 1 EURO	3.39	3.41	3.46	3.44	3.39

Source: Compiled by the authors

Efficiency ratio

The indicator denotes the new value created by fixed and current assets and stocks.

The success or the source of problems of businesses lies in their resource allocation. Tangible assets, such as real estates, plants and manufacturing equipment serve as a basis for generating profit. Technological developments and the continuously changing consumer habits produce new opportunities for growth, while the new production line necessary for manufacturing, or the purchase of equipment mean significant fixed asset investment. If a business is not flexible enough to be able to respond to the emerging needs, it risks the chance of falling into a so-called asset trap. This means that, besides the inflexible expenditures, factories or production lines still generate income, however the profitability indicators decrease, limiting the ability of the business to give the appropriate reply to the urgent needs (Berger, 2017).

When the course of business is examined, the most important is with what efficiency businesses use the assets they hold, in order to generate sales revenue or net production value (Katits & Szalka, 2017).

Efficiency ratios inform us about the contribution of fixed assets and current assets necessary for the generation of production value produced during the business activity, as well as about the return of assets. They are suitable for dynamic analyses and analyses use to businesses. In case of their dynamic shift, partial indicators reflecting background effects, such as fixed asset efficiency and stock efficiency, can get particular importance.

The indicator had the highest value in 2015, then in the following year it decreased as both the value of fixed assets and that of the current assets increased significantly in food businesses in the years 2016 and 2017 (Table 6).

Table 6:
The evolution of efficiency ratio and capital efficiency in Hungary

Denomination	2013	2014	2015	2016	2017
Efficiency ratio	72.77	72.56	75.26	74.68	72.69
Capital efficiency	3.52	3.33	3.08	2.68	2.63

Source: Compiled by the authors

Capital efficiency indicator

This indicator expresses how much performance the business can achieve with its equity available. The indicator can also be interpreted as the turnover ratio of equity. In this case it shows what result can be achieved with the available equity. It is mainly important in the case of long-term decisions.

Domestic Hungarian businesses provide the expected level of capital efficiency, that is to say the level of financial viability. In this regard, they are not worse than the foreign businesses operating in Hungary; only the ones operating with sophisticated technology can stand out from the latter ones, namely the ones with a high level of knowledge behind them. It might have two reasons if Hungarian companies have good capital efficiency. On the one hand, there is a working ownership interest; the owners make reasonable decisions. On the other hand, there is an operating capital market which is forcing them because that is the only way for them to receive funding from the banks. At the same time, it is surprising and paradoxical that they are competitive in capital efficiency while being noncompetitive in productivity (Reszegi & Juhász, 2014).

The value of indicators for food businesses gradually decreased between 2013-2017 as the average growth rate of equity was 10.78%, while that of gross production value was 2.93%, that is to say the amount of equity grew at a more rapid pace.

Complex efficiency

This efficiency indicator shows the combination effect of production factors, which why it is suitable for the measurement of total efficiency. The acceptable value of this indicator is above 1, which means that the used resources produce the yield that the business has formulated as an expectation of them.

The complex efficiency indicators reflect the efficiency of the given business organisation with the ratio of the production resources tied up at the organisation and some production value (Bíró et al. 2012).

The applied multipliers show the average expected return of certain resources. The tied resources are expected to have a result of 20%. The efficiency level of wage cost is estimated to be 1.8.

In the investigation period until 2015, the value of complex efficiency indicators showed an upward trend. The index value above 100% can be considered favourable. Since 2016, the value has decreased. One of the reasons why it is so is the extremely high fixed asset value, which is due to the investments that can have a hopefully positive impact on the efficiency of the following years. The other reason lies in the inappropriate utilization of resources (Figure 2).

The value of the indicator is obviously not only influenced by the return determined by the business, but internal proportions of the resources (the evolution of the asset/the wage ratio) also affect it (Bíró et al., 2016).

Partial efficiency indicators

Partial efficiency indicators are able to evaluate the utilisation of the different resources used.

Partial performance indicators are as follows:

- Net production price per capitalized tangible assets of HUF 100 (fixed assets efficiency);
- Net production value per a stock of 100 HUF (stock efficiency);
- Net production value per all assets of 100 HUF (all assets efficiency).

The higher the proportion of production equipment is within tangible assets, the more favourable the fixed assets efficiency (fixed assets utilization) indicator is. The indicator expresses the effectiveness of the assets, and it obliquely determines productivity, as the primary factors

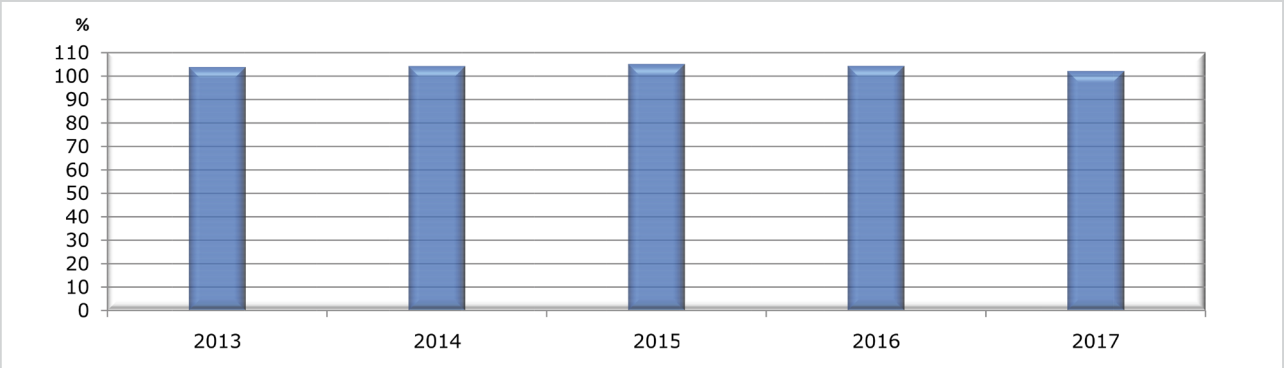

Figure 2:
The evolution of complex efficiency in Hungary
Source: Own compilation

of productivity growth are machinery and equipment. Fixed asset efficiency can be increased either in an extensive (meaning a quantitative change) or in an intensive (meaning a qualitative change) way.

The increase of the extensive use means an increase of the time base of machinery operation (that is the growth of the degree of machinery utilization), for example, introduction of additional shifts or a decrease in downtime. The growth of the intensive utilization means an increase in unit of time (specific increase) of the performance of fixed assets. For instance, more is produced with better technology.

As it can be seen in Figure 3, the indicator value showed an increasing tendency until 2017, then in 2017 it decreased by 7.2% compared to the previous year. This increase is reflected by the net production value. The reason for the decrease in the year 2017 lies in a large increase in the value of fixed assets.

The stock efficiency indicator expresses how much of the production value a stock of HUF 100 gets. Stock efficiency is favourable if the size of the used stock decreases while the turnover remains unchanged, or rather turnover increases while holding certain stock (Bíró et al., 2005).

The standard of stock efficiency and that of all the efficiency ratios is unsteady. The relevant indicator had the highest value in 2016, and all the assets - in 2015 (Figure 4). In 2014 and 2017 the value of stocks, and in 2014 and 2016, the value of all the assets increased at a greater rate than the net production value.

Partial indicators of labor efficiency are as follows:

- Gross production value per 1 person;
- Net production value per 1 person;
- Added value per 1 person.

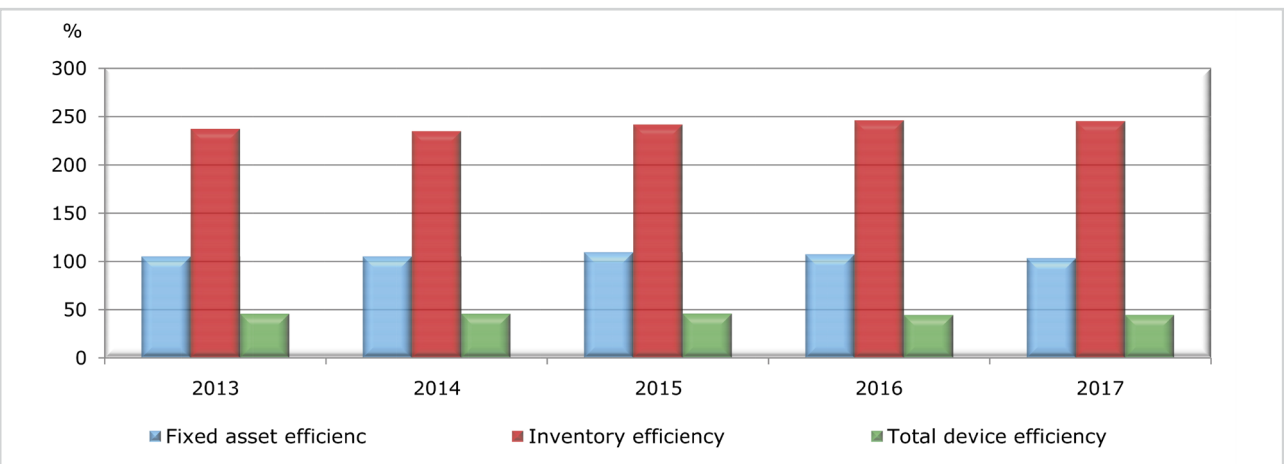

Figure 3:
Development of partial performance indicators in Hungary
Source: Compiled by the authors

The partial indicators of labour efficiency have been increasing steadily as the yield indexes also showed a positive change in the period under review, and the number of employees has decreased year by year since 2014 (Figure 4).

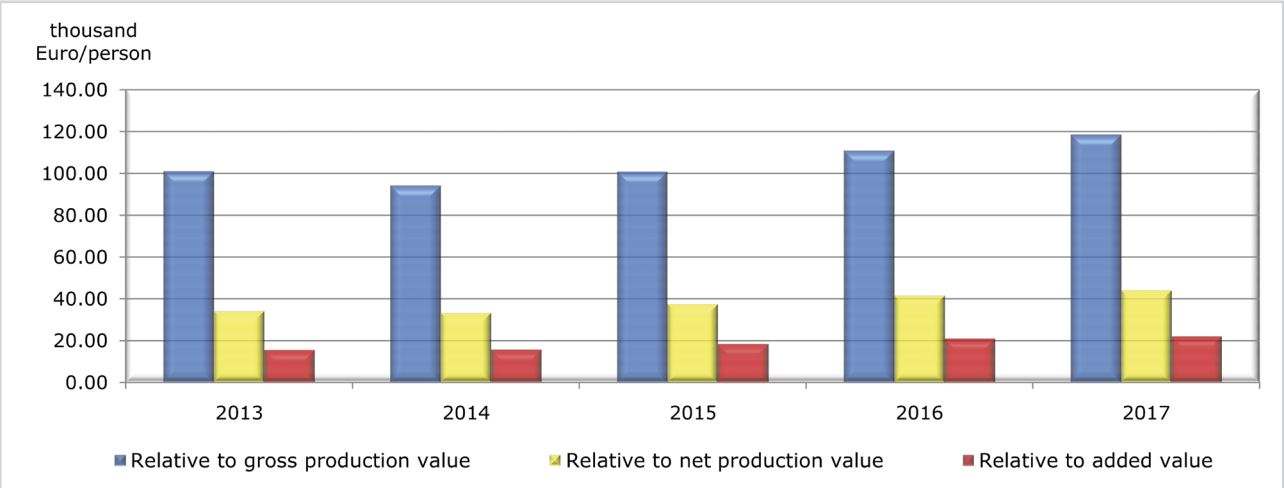

Figure 4:
Partial indicators of labour efficiency in Hungary
Source: Compiled by the authors

Partial indicators of wage efficiency are given below:

- Net production value per labor cost of EUR 100;
- Net production value per personnel expenses of EUR 100.

These indicators express the power of the wages paid to create a new value, thus their value largely depends on the evolution of the net production value. The value of both partial indicators were the highest in 2015 because the largest increase in the net production value compared with that of the previous year took place in that year, and there was a slighter increase in the amount of the labour costs and personnel expenses (Figure 5).

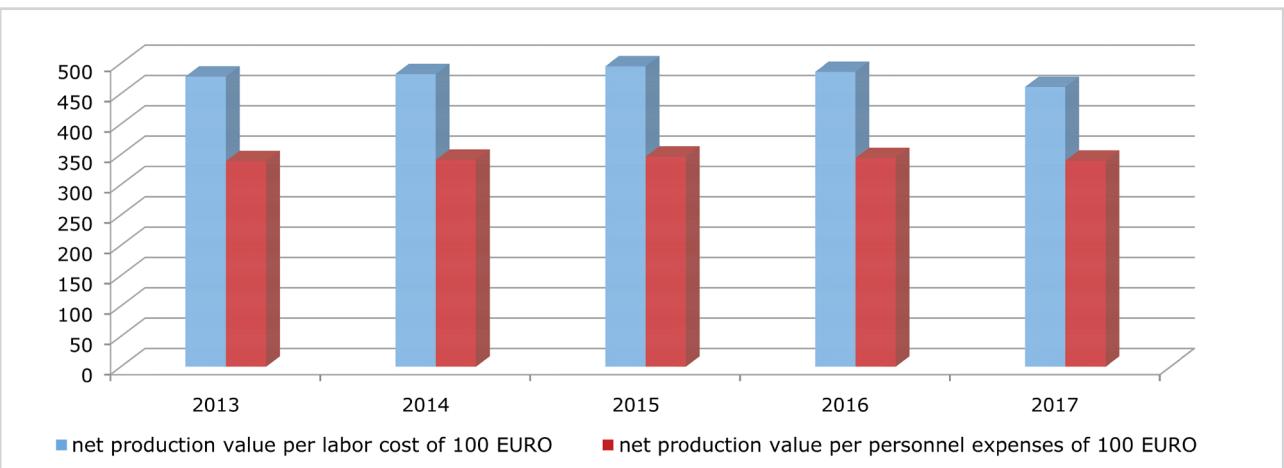

Figure 5:
Partial indicators of wage efficiency in Hungary
Source: Compiled by the authors

Indicators of cost effectiveness

Cost effectiveness of production can be measured with the production cost level indicator which is the quotient of production costs and the gross production value. This is a reverse efficiency indicator.

Components of the production cost are as follows:

- raw material costs;
- material and non-material services procured;

- other services;
- personnel expenses;
- depreciation quota.

The cost efficiency indicators show the ability of unit cost expense to generate a new value. They are calculated by cost types. The Wage and material efficiency indicators play a key role.

The cost level indicator shows how much expenditure of the total yield of the production of the business is required in the given period. Its evolution can be considered favourable in the case it is significantly below the 100% value. In the case of the examined food businesses, it was 76.19% in 2013, and it decreased by 73.82% in 2017 (Figure 6).

The Material efficiency indicator expresses the ability of the used materials (material expenses) to generate a new value. The value of the indicator decreased in the period under review, which means that the gross production value of HUF 100 could be achieved with a decreasing material consumption (Figure 6).

A slight increase can be observed in the indicators of the wage share and the depreciation quota in the period between 2013 and 2017, but their values are still acceptable (Figure 6).

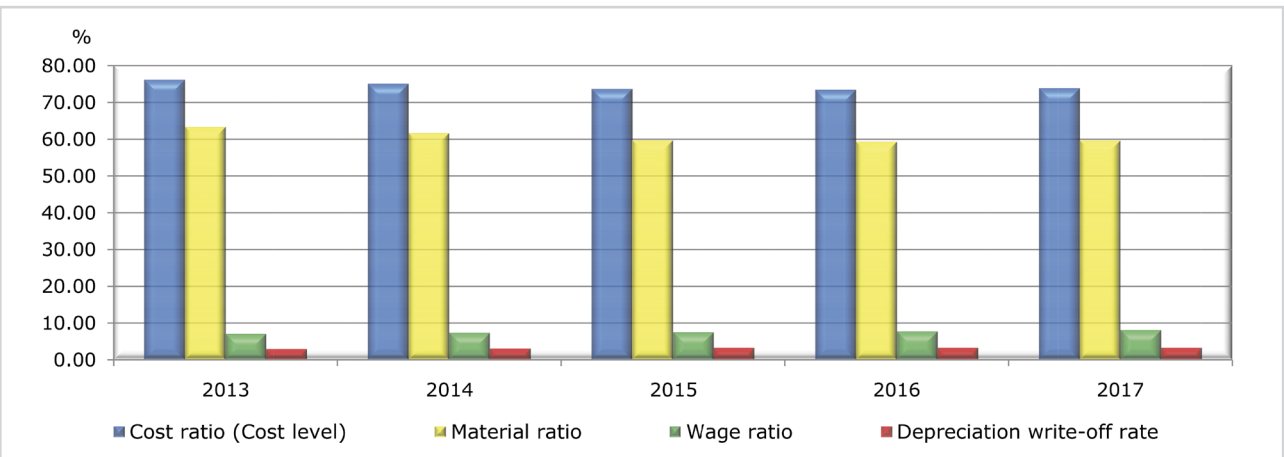

Figure 6:
Evolution of indicators of cost efficiency in Hungary
Source: Compiled by the authors

7. Conclusions

The food industry, despite the fact that its engagement has decreased recently, is of key importance for the national economy as it produces products of higher added value from agricultural raw materials while processing them. Besides the supply of the internal market, the goods produced in the country are also exported to be sold. The food market is increasingly characterised by globalisation, and the Hungarian food businesses have to compete with their rivals in this market. Hungarian food businesses suffer from a competitive disadvantage as their revenue, production added value and labour productivity per one business or one employee is below the data of the major food businesses of the European Union. By contrast, the number of employees in one business is higher, which is primarily due to the cheap labour force and the technological gap.

One of the possibilities is to receive a bigger amount of state subsidy to strengthening, with the help of which quality products can be produced and quality services can be offered (Kovács et al., 2010). One of the possibilities to increase competitiveness is maintaining the appropriate efficiency. In order to increase competitiveness, food businesses must enhance their return indicators. It can only be achieved if their revenue grows, which can happen in two ways: either by improving the volume of production or due to higher sales prices in the market. The latter one is less feasible because a significant amount of consumers purchase the cheaper food products since their ability to pay is low. Thus, a rise in prices can only slightly provide solutions to the increase of efficiency.

Reduction of costs can mean the other way of increasing efficiency. However, the food industry is a sector with high demand of raw materials, and the cost of raw materials is largely influenced by the evolution of agricultural production, so it is difficult to increase efficiency in this field. Production costs can be decreased in the field of wage costs, yet it needs the development of technologies, especially in the case of small and medium-sized enterprises.

It is in the interest of each business to make a more efficient exploitation of resources besides the increase of return indicators because this is the basis of increasing efficiency. It is important to produce quality food products because they can be marketed at a higher price, and the export revenue can also be increased by quality products.

At present, Hungary can be about 120% self-reliant in basic food products. This level can be extended to 150% by the rational and sustainable development of our production capacity, which can mean a great national economic advantage to Hungary when there is going to be a significant global demand for food.

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