

## THE CHALLENGES FOR ECONOMIC GROWTH WITHIN THE FOOD INDUSTRY

Monika ZATROCHOVÁ<sup>1\*</sup>, Milan MAJERNÍK<sup>2</sup>, Martina KUPEROVÁ<sup>3</sup>,  
Štefan MAJERNÍK<sup>4</sup>

<sup>1</sup> Slovak University of Technology in Bratislava, Institute of Management, Slovakia;  
monika.zatrochova@stuba.sk, ORCID: 0000-0002-7198-0988

<sup>2</sup> Slovak University of Technology in Bratislava, Institute of Management, Slovakia; milan.majernik@stuba.sk,  
ORCID: 0000-0002-4421-2801

<sup>3</sup> Slovak University of Technology in Bratislava, Institute of Management, Slovakia;  
martina.kuperova@stuba.sk, ORCID: 0000-0001-8187-4997

<sup>4</sup> Copytrend, Ltd., Bratislava, Slovakia; stefanmajernik@yahoo.com, ORCID: 0000-0003-1171-0211

\* Correspondence author

**Abstract:** The aim of the article is to point out the specifics caused by the way of realization of scientific and technological development in the food industry. The contribution deals with the consideration of specifying the challenges that the food industry is currently facing. It also points to the impact on food security in the Slovak Republic. The subject of the research was the Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava. The strengths of this faculty are the great opportunity and space for the implementation of digital transformation in accordance with the Fourth Technology Revolution, and which will bring a number of new technological changes and knowledge.

**Keywords:** Food security, innovation processes, rational nutrition, education, food industry.

### 1. Introduction

Food business economics are affected by specific challenges. The first challenge – *Ensuring food security for the state* – makes reference to food security from a national perspective, especially if there is no significant deficit in the production of basic food commodities. The second challenge – *Education of the necessary number of graduates for the food industry* – is focused mainly on the education and formation of university-educated specialists for the needs of the food industry and for its scientific and development base.

Although the sector of the food industry is not a decisive sector, its specificities and responsibilities in ensuring the daily nutrition of the population allows it being considered within the structures of the national economy and national economic growth.

Table 1 gives an overview of the results of food, beverage and tobacco production in the years 2011-2017 in the Slovak Republic. The reference period presents the period of output from the economic crisis, which had an impact on the production of beverages and tobacco products.

**Table 1.**

*Development of the economic result for the production of food, beverages and tobacco products in the years 2011-2017 in the Slovak Republic*

Indicator	Year 2011/2015	Year 2016	Year 2017	Index 2017/2016	Index 2017/ 2011-2015
Revenues	4417,5	4258,3	4386,0	103,0	99,3
Costs	4314,3	4085,9	4222,8	103,3	97,9
Result Management	103,2	172,3	163,2	94,7	158,2

Note. Indicator in EUR million, index in %. Adapted from: "Green Report of the Slovak Ministry of Agriculture for 2017". Copyright by the Publisher. Available online <http://www.mpsr.sk/index.php?navID=122&id=8150>.

As shown in Table 1, the decline in revenues ceases in 2017, compared to the years 2011-2015 average. However, the year 2017 is still below the base year 2011-2015. Moreover, costs follow the revenues in 2011-2015 and their share in revenues in 2016 and 2017 is lower than their level in 2011-2015. The cost/income ratio is also reflected in the economic result, which in 2017 was higher than in the base year 2011-2015. The table, therefore, shows that the impact of the economic crisis and its reversal also affected the production of food, beverages and tobacco products.

## 2. Methods

The aim of the article is to point out the specifics caused by the way of realization of scientific and technological development in the food industry. The paper deals with taking into account and specifying the challenges that the food industry is currently facing. It also points out the impacts on food security in the Slovak Republic.

The contribution structure is created in accordance with the requirements for scientific articles (introduction, goal, results, discussion and conclusion). In line with the stated goal of the article, we focused on analyzing the resources that document the issue. As part of the processing of this paper, we used commonly available scientific methods, e.g. analysis, synthesis and comparison, as well as standard statistical methods. As food business economics are affected by specifics and other challenges, the main ones are included in the article.

The methodology of article processing is based on the aim of the article, its main reason, the theoretical definition of food safety, the state, conclusions and the identification of significant findings and warnings in the area of food security of the state – the Slovak Republic.

The subject of the research was the Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava. The strengths of this faculty are its ARRA (Evaluation of Academic Ranking and Rating Agency) assessment, where it ranked as the best technical faculty in the Slovak Republic and a great opportunity and space for the implementation of the digital transformation brought about by the fourth technological revolution, and which will bring with it technological changes and enhanced knowledge. Weaknesses are represented by the declining number of the Faculty of Chemical and Food Technology graduates and the lag behind current trends of digital transformation.

### 3. Results and Discussion

The need for innovation and scientific and technological development in food businesses is obvious. New technologies, possibilities and an extended range create a suitable environment for the application of food products on domestic and foreign markets and strengthening the country's food security.

Emphasis is placed primarily on organic production and technology, organic food production, new products designed to increase efficiency and economy, methods and techniques to support sales, innovation processes in the direction of increasing consumer interest, managing customer relationships, increasing production volumes (which is conditional on increasing the capacity of production facilities), as well as the need to respect the rules of rational nutrition, but also the eating habits of customers.

Special organic food has become part of a "healthy society" and rational diet, and the consumption of organic food means an increased supply of bioactive substances. It should be noted that organic production is not burdened by the use of chemical fertilizers, synthetic substances, chemical preservatives or artificial additives that have a negative impact on human organism.

Another area of research discussed is the production and sale of genetically modified organisms (GMOs). These foods appear on the European market, so it is important that they are labelled. Although part of the public has a radically negative attitude towards these products, they are grown and sold in our territory.

The food industry is distributed relatively evenly throughout the Slovak Republic. Some unions are mostly represented in cities, i.e. j. at the point of consumption, such as breweries, meat industry, confectionery production, others are linked to crop production areas which supply the raw materials of the industry, such as distilleries, canning factories, wineries.

Food businesses produce a wide range of products: dairy, meat and poultry, mill-bakery, confectionery-pastry, sugar, starch, canning, freezing and fish, fat and cosmetic, distilling, brewing, wine, non-alcoholic beverages and tobacco products.

A comprehensive view of the specificities of the food industry, which bear increased costs and the need for extraordinary measures in the management of the food industry, has an impact on the country's food security. Nowadays, according to various methodologies, the self-sufficiency of Slovakia in food is approximately 45-50%, but at the beginning of the transformation of the agri-food complex it exceeded the 80-percent limit and in the temperate zone commodities it was 100%, and even larger, because of exports. The deterioration of this indicator by around 30% over the last twenty years is a very dangerous trend.

This is also confirmed by the table of consumption of selected types of food per capita in the Slovak Republic in relation to the recommended food dose and in relation to the allowable rational consumption interval (Table 2).

**Table 2.**

*Consumption of selected foodstuffs per capita in the Slovak Republic in relation to the recommended food*

Type of food	Reality in years					Difference 2016-2017	Recommended dose of food	Allowed interval of rational consumption
	2013	2014	2015	2016	2017			
Meat	53,30	47,90	50,60	59,00	62,10	8,40	57,30	51,60-63,00
Fish	5,10	5,40	5,30	5,10	5,40	-0,20	6,00	unspecified
Milk-products	158,50	166,80	169,20	175,50	176,10	6,30	220,00	206,00-240,00
Cereal - flour	81,00	79,80	81,20	77,30	76,50	-3,90	98,50	94,00-103,00
Potatoes	47,40	47,00	48,90	46,90	48,50	-2,00	80,60	76,30-84,90
Leguminous plants	1,30	1,30	1,30	1,50	1,50	0,00	2,60	2,10-3,20
Vegetables	104,70	104,70	100,90	108,30	104,70	7,40	127,90	116,90-138,90
Fruit	54,90	60,80	65,70	63,30	60,50	-2,40	96,70	86,70-106,70
Fat together	22,20	20,60	21,10	21,70	21,60	0,60	22,00	19,80-23,10

Note. Index in %. Adapted from: "Green Report of the Slovak Ministry of Agriculture for 2017".

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### 3.1. The specifics of the food industry

The food industry is indispensable among the industries of our economy. The main tasks include ensuring the nutrition of the population and the processing of Slovakia's agricultural production. Focusing on the development of the food industry depends on structural changes in food processing and production and the relationship between agricultural production and chemical-food technologies. Especially in recent years, there has been a concentration on special foods, organic food and other high quality products that support a rational diet.

The successful development of the sector is conditional on close cooperation with agriculture. The provision of the classic assortment, as well as special products that are in constantly growing demand, requires innovations and reconstructions in the area of corporate strategies, securing production facilities and modern waste-free technologies.

The food business economy is affected by the specificities and other challenges arising from:

- The nature of the food production.
- The nature of the production factors and the course of production processes in the food industry.
- The position of the food industry in the reproductive process, caused by the nature and manner of realization of scientific and technological development in the food industry.

The first challenge: The concept of food security is not an anachronism, as some advocates of ultra-liberalism claim, but in its definition it takes into account quality and human dimensions.

The first challenge has three main dimensions: the sufficiency of supply, affordability and the health of food. From the point of view of the state, it is possible to talk about food security especially if there is no significant deficit in the production of basic food commodities. Several expert studies are of the opinion that its current threshold is at the moment, around 80% of domestic demand. That is the state we had in Slovakia in the early 1990s (Slovak Agricultural and Food Chamber, Food Industry, Economic Statistics, 2017).

According to the Slovak Agricultural and Food Chamber, food security was not among the state priorities in the last two decades. The collapse of the entire agri-food sector, particularly livestock production and the related food industry, was caused by a failed economic transformation, strong competitive pressure from abroad, the uncontrolled emergence of foreign trade systems within our market, as well as the EU's "two-speed" common agricultural policy, which disadvantages our farmers. The domestic production base paid extra for the absence of food and trade policy, which was never processed and therefore not implemented comprehensively, because it almost always lacked the final phase – production and sales.

Based on a survey of recent years, we note that at 48.9%, domestic-sourced food sales are lagging behind abroad, as the EU average is 95%, in neighboring Poland it is 82%, in the Czech Republic – 72% and in Hungary – 71% (Slovak Agricultural and Food Chamber, Food Industry, Economic Statistics, 2017) From the perspective of domestic food producers, it is unbearable for business systems to play with them as a cat with a mouse.

From the above survey, our food industry is one of the most vulnerable industries. The structure of food production is developing very unfavorably, especially in those manufacturing sectors that produce basic foods important for the nutrition of the population. Still, other sectors, which are less important in terms of nutrition, improve the overall food performance in Slovakia. The basic distinction between Western and Central European countries is indisputable: in Germany, Austria, France or the United Kingdom, the distribution of food is clearly in the hands of domestic companies, and in-nation production supplies about 80% of all food items found on the shelves. Foreign trade chains dominate in the Czech Republic, in our country or in Hungary, and this share is only 60%, respectively. We can say that such a big difference cannot be random.

Paradoxically, the consumer suffers unknowingly from the intense competition between trade chains in Slovakia. A great deal of competition leads the chain to the fact that price is the most important criterion for the supply of goods, and this decision leads to supplying the population with food of questionable quality. However, our consumer reacts to a low price very actively, and this consumer property forces the chains to continue to search for suppliers who can offer goods at the lowest prices. To conclude this, we find that in Slovakia, multinational companies have had incredibly high profits in recent years, while our domestic agriculture and food industries are struggling to survive.

When comparing with neighboring countries (Czech Republic, Hungary, Austria), it can be seen that the economic results of food and trade suppliers are unbalanced. This is possibly related to the fact that the surrounding countries have set certain limits for doing business through legislation (restrictions on sales on Sunday and over holidays (Hungary, Austria), from 2018 - limited holidays and holidays in Slovakia).

Recognizing this problem, the Ministry of Agriculture has adopted a law that has precisely brought about inadequate conditions in food supply. It should not be a problem for Slovakia to save food production in Slovakia due to the self-sufficiency of food supplies, which, unlike many imported controls, has a guaranteed quality – yet there is. We can also ask, "And what will be the quality of imported food?" Nowadays, the most problematic are the controls on the quality of food imported by different companies. It is also important to maintain employment. There is a significant number of employees working in the food industry, so the problem must also be addressed in order to preserve jobs.

In the year 2008, 56300 persons worked in the food industry and the average in 2012-2016 was 52900 persons, in 2016 54400 persons were in the industry, and in the year 2017, it was 50500 persons (Green Report, 2017). Therefore, it is evident that jobs and businesses are at risk. It may be that low-value-added raw material will be exported from Slovakia and then processed into high-value-added products that will be re-imported. This implies that in this way we will "give people work abroad".

The second challenge is training the necessary number of graduates for the food industry. The object of the research was the Faculty of Chemical and Food Technology (FCHFT) of the Slovak University of Technology (SUT) in Bratislava. FCHFT is one of the seven faculties of the Slovak University of Technology in Bratislava. It was founded in 1940, by the Department of Chemical Technology Engineering. According to the evaluation of the ARRA (2018); where a total of 112 schools of Slovak universities or mono-faculty schools were assessed (104 public schools and 8 faculties of private universities in 11 groups of study programs), SUT ranked highest. One of the most appreciated technical faculties is the FCHFT.

Table 3 shows the number of SUT students in academic year 2002/2003 and academic year 2018/2019, and the enrolment figures for the faculties in which they study.

**Table 3.**

*Student enrolment in the Slovak University of Technology in Bratislava: students in the academic year 2002/2003 and academic year 2018/2019*

Faculty Slovak University of Technology (SUT) in Bratislava	Academic year 2002/2003	Academic year 2018/2019	Decrease/increase (%)
Faculty of Civil Engineering	3387	2145	-37
Faculty of Mechanical Engineering	1994	820	-51
Faculty of Electrical Engineering and Information Technology + Faculty of Informatics and Information Technologies	3670	3349	-9
Faculty of Chemical and Food Technology	1884	1402	-25
Faculty of Architecture	1163	902	-22
Faculty of Materials Science and Technology in Trnava	5141	1911	-63
Institute of Management	-	154	-
<b>SUT together</b>	<b>17189</b>	<b>11130</b>	<b>-35</b>
External study	3958	1718	-57
Foreign students	137	447	+310

Note. Decrease in %. Own processing.

The Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava has seen the growth of foreign students in the given period, confirming its international standard and reputation.

The Faculty is the most successful technical school in the Slovak Republic and Bohemia. This is, thus, a guarantee of the quality and experience of internationally renowned scientists, educators and the whole study system. Unlike other schools, obtaining a degree is not the most important. Rather, our graduates are known for having acquired skills to solve theoretical and practical problems. The subjects of the program provide wider insight and long-term knowledge, even though the program is a modern and fast-paced. Add to this the superbly equipped laboratories, positive student/teacher ratio, balanced education and language preparation.

What is more, it provides pedagogical and educational work throughout all of its Departments. The Department of Food and Nutrition has two departments: Food Technology Department; Nutrition and Food Quality Assessment Unit.

Table 4 shows the number of engineering students at the Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava.

**Table 4.**

*Number of engineering students at SUT's Faculty of Chemical and Food Technology*

Field of study	Academic year 2004/2005	Academic year 2009/2010	Academic year 2014/2015	Academic year 2016/2017	Index 2017/2005 (%)
<b>Food, hygiene, cosmetics</b>	31	41	51	52	167,70
<b>Nutrition and Food Assessment</b>	18	19	21	28	155,60
<b>Management of technological processes</b>	55	73	41	32	58,20
<b>Together</b>	104	133	113	112	107,70

Note. Index in %. Adapted from: "Annual reports of the Faculty of Chemical and Food Technology 2005 to 2017". Copyright 2017 by the Publisher. Available online [https://www.fchpt.stuba.sk/english/faculty/annual-reports.html?page\\_id=1761](https://www.fchpt.stuba.sk/english/faculty/annual-reports.html?page_id=1761).

Small and medium-sized enterprises (SMEs) represent the dominant form of business organization in the Slovak Republic. Their competitiveness depends on the ability of workers to meet the new requirements for skills and qualifications. A key problem for SMEs is a need to improve their innovative capacity. In view of the limited available resources, they often have issues not only with attracting young employees and keeping them after completion of the training and education, but also with the integration of older employees. Hence, they must deal with the problems arising from the ageing of the workforce and age-related changes in the structure. In this context, there are important measures of success, such as the increase in the employment rate of women and older employees.

Because of the nature of Slovak enterprises, those entering and in the work force need to use all available knowledge, skills and qualifications, in order to achieve more flexible qualifications, regardless of where and how they have been obtained. The key results should be improved quality of work and better overall performance of the organization, changes of mentality and increased confidence. From the point of view of the individual employees it is also important to verify their previous skills and work experience, because doing so enhances their chance on the labour market (Glatz, and Mišota, 2016).

Table 5 shows current and near-future disassociation between number of graduates and available work positions in 2018-2023. In the period 2018-2023, 53000 graduates will be missing from the labor market.

**Table 5.**

*Current and near-future disassociation between number of graduates and available work positions in 2018-2023*

Study field/employment	Number of missing employers
Engineering	32000
Construction	8000
IT	7000
Accounting and auditing	6000
Summary of missing graduates	53000

Note. Own processing.

Of Slovakia's two major challenges, the first of which is in safeguarding the state's food supply, the second challenge is to educate the necessary number of graduates for the food industry. Its focus is primarily on the upbringing and formation of university-educated professionals for the needs of the food industry and for developing and maintaining its scientific and development base.

The conclusion of the paper proposes measures to improve the food industry. The research investigated the decline in the number of students at the Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava in the period under review. The reasons for the decline are:

- Decrease in demographic development in Slovakia, as well as within the EU.
- Study opportunities at foreign universities due to Slovakia's accession to the EU.

- Decrease in the number of external study students.
- The need for changes in technical education in higher education.

It should be noted that as it stands, educational and educational work in this faculty is primarily focused on the education and formation of university-educated professionals for the needs of the food industry and its scientific and development base.

In the Engineering degree program "Management of Technological Processes in Chemistry and Food", graduates are employed as technologists, operating engineers, and managers in Slovakia's food industry, as well as in cosmetic industries and associated factories, food and health control laboratories, in food quality inspection, logistics and conservation work.

Graduates are familiar with chemical-technological, chemical-engineering, biochemical and physicochemical processes that take place in the production of food products, in addition to the composition of raw materials, auxiliary substances, methods of laboratory and operational control, modern methods of food evaluation, the latest findings from physical and colloid chemistry and application of theoretical foundations from general basic scientific disciplines and the latest mechanization, automation and production process management.

The aim of food and nutrition management is to provide the students with the necessary theoretical and practical knowledge required to master the following study of food technology.

The Technological Process Management program at the Chemical Food Industry operates at the Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava and is intended especially for those graduates who are interested in technical and engineering studies, and in deepening their knowledge of chemistry, informatics, computers, management and economic sciences.

The graduate of the study program will acquire education in the field of implementation and use of automation in the chemical and food industry, in the field of application of information technologies in the chemical and food industry and in the field of management from the simplest processes to the management of enterprises, while also having basic knowledge of the chemical and food technology industry. Graduates of this program are among those who are best placed to make a career, not only in the chemical and food industries, but also in other sectors of the economy and research.

The department also provides economic-management subjects for all study programs at the Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava. Innovation needs to be largely implemented here as faculty students are specialists with little interest in humanities. The innovativeness of subjects is ensured through cooperation with the non-profit organization 'Junior Achievement Slovensko' (JA Slovakia), where they can obtain certificates that are recognized by economic practice. At the same time, professional lectures are supplemented by practice which are enriched for the student's professional profile.

JA Slovakia educational programs reflect present needs of schools, labor market and society. From the academic year 2016/2017 onwards, implementation of JA programs is recommended by the Ministry of Education, Science, Research and Sports of the Slovak

Republic through Pedagogical–organizational instructions to support curriculum in areas of financial literacy and entrepreneurial education. Each year schools are offered the opportunity to participate in programs which make the learning process playful, interesting, attractive and bring not only students, but also teachers new opportunities.

The paper presents the results of the research found on the object of investigation and the development of the number of students at the Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava, which were obtained on the basis of methods of statistical analysis and comparison. Findings are in line with forecasts made by SAS, Ministry of Education, Ministry of Labor and Family of the Slovak Republic and other institutions.

The food security of our country should have a strategy for the development of the sector with regard to the creation of new jobs that would arise in both primary production and food. The Food Industry Development Concept 2014-2020 has helped this step. There is also a need to attract more investors, to provide support for research, modernization and product innovation in the food industry. The intent is to increase the market share of domestic food producers from the current 45 to 80 percent. Designing specific tools, are therefore, being put into place to achieve this. These are:

- The creation of a new sales fund in which the State would levy compulsory contributions from the food industry on domestic food advertising.
- Forcing shops to publish at their entrances how many domestic foods they sell.
- Control and statutory limitations on the amount of fees charged by the chain from the food industry for receiving domestic-produced goods, for transporting products or for producing advertising.

Furthermore, the application of the adopted law on inadequate conditions in the relations of food suppliers to retail chains and the current Law on levies should be consistently maintained. If the state wants to increase food self-sufficiency, it should particularly strive to put an end to the unequal subsidization of farmers from the west and east to the Union, which is reflected in the weaker competitiveness and quality of food products in Slovakia. Evaluation of production efficiency in Slovakia, the effectiveness and success of businesses becomes a part of responsible and modern management. Efficiency of the business activities currently represents a powerful competitive advantage, the exploitation of advantage leads to the perspective of long-term success (Kajanová, 2015).

### **3.2. VAT rates in the EU**

The EU sets the broad VAT rules through European VAT Directives, and has set the minimum standard VAT rate at 15%. The 28 member states are otherwise free to set their standard VAT rates. The EU also permits a maximum of two reduced rates, the lowest of which must be 5% or above. Some countries have variations on this, including a third, reduced VAT rate, which they had in place prior to their accession to the EU.

Member states have now agreed that they will be free to set the reduced rates on most goods and services, including: e-books, domestic fuel, clothing and female hygiene products. Compared to the surrounding EU countries, Slovakia supports the development of the food industry in the neighboring countries (the current rates in selected EU countries are seen in Table 6).

The previous problem of domestic food producers is the high VAT rates, as the standard VAT is 20%. This has been addressed and the reduced VAT rate of 10% in Slovakia is on food, pharmaceuticals, accommodation and hotel services. This new VAT began to be applied in 2019. Intra-community and international passenger transport is at 0 VAT.

**Table 6.**  
*VAT overview in selected EU countries*

State	Standard VAT	Reduced VAT	Note
Austria	20	13	Domestic flights; entrance to sporting events; admissions to cultural events and amusement parks; hotel accommodation; firewood; some agricultural supplies; wine production; cut flowers and plants for decorative use.
		10	Foodstuffs; take-away food; water supplies; pharmaceutical products; domestic transport (excluding flights); international and intra-community road and rail transport; newspapers and periodicals; printed books (excluding e-books); pay and cable TV; TV license; social services; domestic refuse collection; treatment of waste and waste water; restaurants (ex all beverages); cut flowers and plants for food production; some agricultural supplies, writers and composers.
Czech Republic	21	15	Foodstuffs (excluding essential child nutrition and gluten-free food); non-alcoholic beverages; take away food; water supplies; medical equipment for disabled persons; children's car seats; some domestic passenger transport; some books (excluding e-books); admission to cultural events, shows and amusement parks; writers and composers; social housing; renovation and repair of private dwellings; cleaning of private households; some agricultural supplies; hotel accommodation; admission to sporting events; use of sporting facilities; social services; supplies to undertaker and cremation services; medical and dental care; domestic care services; firewood; some pharmaceuticals; some domestic waste collection and street cleaning; treatment of waste and waste water; food provided in restaurants and cafes; cut flowers and plants for decorative use and food production.
		10	Foodstuffs (selected baby food and gluten-free food); newspapers and periodicals; some pharmaceutical products; some books (excluding e-books).
Germany	19	7	Some foodstuffs; water supplies (excluding bottled water); medical equipment for disabled persons; some domestic passenger transport; intra-community and international passenger transport for certain road, rail and inland waterway transportation; books (excluding e-books and books whose content is harmful to minors); audiobooks; newspapers and periodicals (except those containing content harmful to minors and/or more than 50% advertising); admission to cultural events; writers and composers; some agricultural inputs; hotel accommodation; certain admission to sports events; social services; medical and dental care; firewood; some timber for industrial use; take away food; cut flowers and plants for decorative use and food production; taxation of some gold coins and jewelry.

Cont. table 6.

<b>Hungary</b>	27	18	Certain foodstuffs; some take away food; admission to certain open-air concerts; hotel accommodation.
		5	Certain foodstuffs; pharmaceutical products (intended for human use); some medical equipment for disabled persons (excluding repair); books (excluding e-books); newspapers and periodicals; some social housing; district heating; some supplies of new buildings; restaurant and catering services (food prepared on site and non-alcoholic beverages); internet access services; certain writers and composers services.
<b>Poland</b>	23	8	Certain foodstuffs; water supplies; pharmaceutical products; medical equipment for disabled persons; children's car seats; children's diapers (disposable); domestic passenger transport; some newspapers and periodicals; admission to cultural events and amusement parks; some pay TV/cable TV; writers and composers; social housing; certain renovation and repair of private dwellings; certain agricultural supplies; hotel accommodation; restaurants (excluding alcoholic and certain other beverages); admission to sports events; use of sports facilities; undertaker and cremation services; collection of domestic waste; minor repairs of bicycles, shoes and leather goods, clothing and household linen; hairdressing; firewood; some take away food; some bars and cafes (restaurant service only); cut plants and flowers for decorative use and food production (some at 5%); some supplies of new buildings; some construction work on new buildings, treatment of waste water.
		5	Some foodstuffs; fruit juices; certain books and specialist periodicals (excluding e-books); some agricultural supplies, some food for consumption on-board passenger transportation.
<b>Slovakia</b>	20	10	Some foodstuffs; pharmaceutical products; some medical equipment for disabled persons; books (excluding e-books); hotel and accommodation.

Note. Vat in %. Adapted from: "2019 European Union VAT rates". Copyright 2019 by Publisher. Available online <http://www.vatlive.com/vat-rates/european-vat-rates/eu-vat-rates/>.

### 3.3. Why are there different VAT rates in the EU?

European acts in the field of taxation have to be adopted by unanimity. The current provisions on VAT rates are thus the result of different compromises agreed by all the EU Ministers of Finance. The VAT Directive sets the framework for the VAT rates in the EU, but it gives national governments freedom to set the number and level of rates they choose, subject only to 2 basic rules. Rule 1: The standard rate for all goods and services. Rule 2: An EU country can opt to apply one or two reduced rates but only to goods or services listed in the VAT Directive.

*Standard VAT rate* is the rate that EU countries have to apply to all non-exempt goods and services. It must be no less than 15%, but there is no maximum. This rule is in force until 31 December 2015.

*Reduced rates of VAT* – EU countries have also the option to apply one or two reduced rates which may be applied to goods or services listed in Annex III of the VAT Directive but not to electronically supplied services and must be no less than 5%.

*Special rates* refers to the multiple exceptions to the basic rules. Largely for historical reasons and under certain conditions, many EU countries (in some instances, most of them) have been allowed to depart from these rules for a transitional period, with the objective to

allow for the gradual alignment of national laws with the VAT Directive, pending the definitive adoption of agreed VAT arrangements by all EU countries. This enables them to keep "special rates" – reduced rates under 5% (including zero rates) and reduced rates for goods and services.

The words of Kajanová, must be recalled: Evaluation of the efficiency in Slovakia, effectiveness and success of businesses becomes a part of responsible and modern management. Business efficiency currently represents a powerful competitive advantage, the exploitation of advantage leads to the perspective of long-term success (Kajanová, 2015).

#### **4. Summary**

The role of the teacher is not easy. Learning formulates pillars of education and training for the 21st century. Aspects of learning include: Learning to explore – controlling the tools that can be explored, explored, understood and developed throughout life, because real knowledge is that which the individual man constructs himself; Learning to act – being an active solver of life situations rather than a passive manipulated object, though capable of free decision making; Learning to live together – to respect, to tolerate the differences of others, to cooperate with them, not to fight them, not to control them, but to act responsibly and morally towards them; Learning to be – being an authentic personality who knows what he wants, who lives his own life, is himself, finds the meaning of his own life, his own happiness and his identity. To achieve these goals, education must be humanized.

How to address the upbringing of the necessary number of graduates for the food industry? Research has shown that higher education also needs changes in technical education through the digitalization and humanization of technical education. The labor market in the era of digital age will need people able to engage in demanding activities. Up to half of companies in Slovakia are planning digital transformation (the transition from paper to digital communication). This also includes process automation and digitization of customer relationship management, the use of accounting and warehouse applications to analyze business data. Digital transformation is not just about introducing technologies, but can also change the way businesses, business processes and corporate culture work with them. Technologies must open up new horizons for people, for example, through data analysis and visualization, and free up space for collaboration and innovation.

Digital transformation is the content of the Fourth Technological Revolution – which will bring many new technological changes and knowledge. Their processing requires utilization of a technological education, the scientific knowledge of which is part of the integration of the whole educational process (technological – humanization – ethics and morality).

Practical recommendations are based on research on the object of investigation and confirm the need to realize the forecasts of these institutions of the need to turn quantity into a quality

of higher education based on EU standards and its recommendations and to bring university studies closer to practice. The output should be a drop in the number of university graduates. Furthermore, each student should consider the possibilities of employment in the labor market based upon the forecast of labor market development.

Humanizing education is a phenomenon that is most needed today. It is primarily necessary in the practice of teaching, in the improvement of human relationships and behavior. A turning point in the renewal of human values and ethical standards in the realization of the human dimension of education is desirable. This must include the motivation of a person's lifecycle to find positive values for Nature, society and for himself. The basic competence of a technically educated man is increasingly affecting his communication, argumentative and language skills. Graduates must increasingly require empathy and motivation for better results.

Practice recommendations are based on research, on the subject of research and on confirming the need to implement the forecasts of these institutions by converting quantity in higher education to quality based on EU standards and its recommendations and to bring higher education to being useful in the real world. There will be less students, because students must consider the possibilities of employment based upon a prognosis of labour market developments.

The aim of the research was to decrease the number of students at the Slovak University of Technology in Bratislava. The object of the research was the Slovak University of Technology and the Faculty of Chemical and Food Technology. The undertaken research has shown how to address the recruitment and course offer of the necessary number of graduates for food and general industry in Slovakia. The intent is to convert quantity to quality of the offer based on EU Standards and Recommendations to Bring College Education to Practice. Research has shown that higher education also needs changes in technical education through digitalization and humanization of technical education. Each student should consider post-educational professional life based upon the forecast of labor market development. Of note, according to the forecast of the labor market development until 2023, about 53000 graduates in this field will be missing in Slovakia. Here, we see research space for other universities, as well as the application of KEGA and VEGA programs.

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