

Challenges of labour supply in agri-food sector in Hungary

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Abstract: *In recent years many national and international research have proved that in agriculture, like in other sectors, the availability of human resources with appropriate qualities is one of the basic conditions for increasing productivity. The agri-food sector is increasingly becoming knowledge-intensive: to deal with the challenges arising from the changes of the economy, social life and natural environment requires learning new skills and competencies in addition to the farming knowledge in a traditional sense. The question is what extent the human resources background of the sector meets the demands of employers' requirements? In our paper beside the presentation of the human resource situation of the Hungarian agriculture we show the results of a questionnaire survey carried out in almost one thousand agricultural and food producer enterprises in the autumn of 2016. This survey identifies the requirements from the current and future labour force in agri-food enterprises. Demand of labour force in agri-food sector is increasing in Hungary, nearly one-third of the enterprises in the sample – have potential for labour expansion. The analysis of data has shown that most of the business leaders became aware of the role of increasing the competitiveness of human capital development, three-quarters of them train their employees. Nearly 60 per cent of the surveyed agri-food enterprises use a solution based on the combination of several tools to retain and motivate labour. The surveyed managers particularly missed the professional practical skills, the ability of systems thinking and the existence of economic knowledge from the competencies of young employees.*

Keywords: *human resource, agricultural labour supply, vocational training in agriculture,*

Introduction

According to global demographic trends, Hungary belongs to those countries where the number of the working age population will be expected to decrease with the highest rates in the next 15-20 years. Due to the technological development, the advancement of computerisation and robotization the qualification structure of the increasing labour demand also changes. Demand for high- and low-skilled occupations is likely to expand, but semi-skilled jobs will be lost (Hays Recruiting experts worldwide, 2011).

The abilities for proactivity and quick adaptation to new situations while considering a wide range of aspects are more and more appreciated and valued. In the agricultural sector due to the continuously present risks and uncertainties it is especially important to acquire these skills and abilities as well as the related theoretical and practical knowledge for sustainability. This kind of flexibility cannot be overlooked during the education and training of agricultural experts, farm managers, farmers and agricultural employees. This means that the vocational training system (and preferably the whole education system, including non-formal education as well) should be ready for responding this challenge and provide their students the appropriate preparation and training for making them resilient, that is enabling them to cope with change and to adapt successfully, moreover to act proactively.

Recognizing both economic and non-economic aspects, the OECD proposed a broad definition of human capital as 'the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being' (OECD, 2001). The OECD considers different ways to measure human capital taking a range of indicators. Among factors that determine human capital are skills and qualifications, education level, work experience, work habits and intelligence (Frank and Bemanke, 2007).

Researches have shown that human capital and education have a direct impact on economic performance and growth as well as productivity and social processes (e.g. Hanushek and Woessmann, 2010; Latruffe, 2010; Sikorska, 2011). The relationships between management, management skill level and the profitability, productivity and economic performance of farming have been investigated since the 1970s (Boehlje, 1973; Gale Jr., 1994; Goddard et al., 1993; Sumner and Leiby, 1987; Zepeda, 1990).

In agriculture, like in other sectors, the availability of human resources with appropriate qualities is one of the basic conditions for increasing productivity (Swinnen and Vranken, 2010). The higher level of qualification and the associated practical experience can increase the adaptability of farms, allow specialization, enhanced diversification, and the application of innovative solutions, modern, competitive technologies and production methods (Baptista, 2012). Like other sectors, agriculture is increasingly becoming a knowledge-intensive sector: to deal with the challenges arising from the changes of the economy, social life and natural environment requires learning new skills and competencies (e.g. ICT competencies, foreign language skills, marketing skills) in addition to the farming knowledge in a traditional sense (Dudek et al., 2014).

Several studies have confirmed that there is a strong and significant correlation between the production results, the investment activity and the level of education of the farm manager too (Nowak, 2014; Kemény et al., 2017). Manevska-Tasevska (2013) examined the impact of qualification and knowledge of farmers of the technical efficiency of the farm among family farms. Their results clearly demonstrated that the education level of the farmers have a direct impact on the economic performance of the farm. The more educated farmers can not only easier adapt to the changing conditions, but they are also more effective in finding and implementing new, innovative solutions (Biró et al., 2014).

Based on an extensive literature review it can be stated that human capital and its determining factors such as knowledge and skills have a decisive role in the competitiveness of the national economy including food economy as well. The questions are: what are the main characteristics of the agricultural human resource background of Hungary in an EU comparison, where can be found the main deficiencies and development reserves and what are the expected sectoral labour market tendencies? Furthermore, what extent the human resources background of the sector meets the demands of employers' requirements, and whether the agricultural vocational training system playing a key role in knowledge transfer and youth education is able to respond to the ever-changing challenges of the economy and labour market?

This paper aims to identify the main emerging problems and challenges concerning the human capital background of the Hungarian food economy, to provide guidance on how to ensure continuity of labour supply, moreover to map the labour demand in the sector and the present and future expectations required for the employees as well as to explore the experiences and suggestions of the agri-food enterprises related to the dual vocational training system.

Methodology

Beside the review of the relevant literature and labour market statistics the research is based on a primary survey on a representative sample of the Hungarian agri-food economy actors. This primary survey is the so-called Agricultural Labour Market Barometer Survey conducted in the autumn of 2016. It was a questionnaire survey where 1000 agri-food ventures were selected according to subsectors (field crop production, horticulture, livestock production, mixed farming, processing of food and other agricultural row products, services and trade). The development of sub-samples localized by county level based on the member registration of the Hungarian Chamber of Agriculture, the regional statistics of Hungarian Central Statistical Office concerned to food industry and agricultural firms, and the FADN data operated by the Research Institute of Agricultural Economics. Considering that the survey focused its examination on the employed workforce of the food economy, enterprises having at least one employee were included in the sample. The surveyed farms and firms were

selected by stratified sampling. The sample was representative of sector, revenue and number of employees among Hungarian agricultural firms employing at least one person. The questionnaires were filled in with the personal assistance of the Hungarian Chamber of Agriculture's rapporteurs. Out of the 1000 questionnaires 907 usable responses were recorded. This article presents the topics connected to the labour supply, the entrants, the agricultural vocational training including the experiences from the practical training of students with apprenticeship contract among the topics of the questionnaire containing 40 questions. Descriptive analysis between variables was made using the SPSS software. Results were introduced by applying descriptive statistics and multivariate analyses. The research identified labour supply strategies of the agri-food enterprises using K-means clustering during the processing of the results. After examining the intensity of the relationships among the variables by the cluster analysis, the highest level of education of the manager, his agricultural qualification level, age and the tools applying labour motivation were taken into account. This latter was formulated as a complex indicator based on the composition of the tools used by factor analysis.

Results

Labour use in agriculture

Declining role of agricultural employment is a common phenomenon in parallel with the improvement of mechanization, and the labour productivity growth in developed countries. The number of agricultural employees fell by an average with 27.9 per cent in the EU-28 between 2004 and 2016. During the examined period the largest percentage (50-55 per cent) decrease took place in Portugal, Lithuania, Croatia and in Slovenia. In Hungary as well, the agricultural sector could have been characterised by a continuous labour outflow until 2008. Between 2008 and 2016 however, a 30 per cent increase (with minor fluctuations) could be observed in the number of employees which thus reached 217 thousand by 2016 and accounted for a five per cent sectoral share from the country's employment (compared to the 4.2 per cent average in the EU-28) (Fig. 1 and Fig. 2).

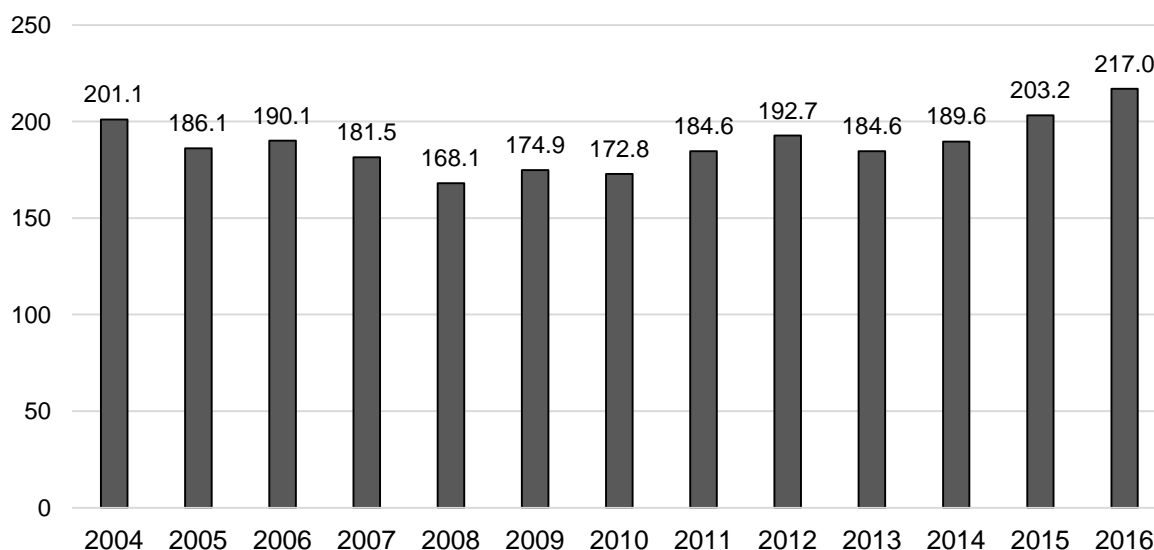


Figure 1. Number of agricultural employees in Hungary, 2004-2016, thousands of persons

Source: Hungarian Central Statistical Office, 2017

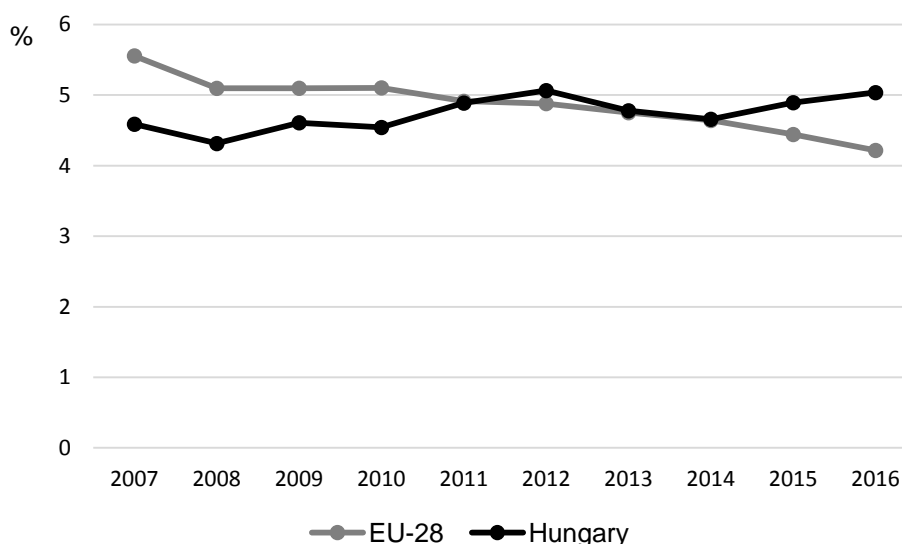


Figure 2. Employment in agriculture, % of total employment, 2007-2016

Source: Eutostat, 2017

The structural feature of the agricultural labour supply is that the proportion of (unpaid) family labour utilization is significant in the sector, 73.7 per cent in the EU-28 on average, 68.4 per cent was in Hungary in 2016. The use of paid labour force significantly exceeded the use of family labour only in the Czech Republic and Slovakia while a remarkable part of the agricultural land and labour is bound to the larger corporate farms in these countries (Hamza et al., 2016). While in Hungary the majority of agricultural employees (68.0 per cent) work in full-time (225 days per a year or more are workdays), their proportion is 63.2 per cent in the EU-13, and it was much lower, only 48.4 per cent in the EU-15 in 2013 (Biró et al., 2016). The largest (70.0 per cent) or greater share of part-time employees is characteristic in the Mediterranean countries (Italy, Spain, Greece, and Croatia) as well as in Austria and Finland.

Age structure

The unfavourable age structure is a key problem in terms of the labour supply in the sector. The age structure of agricultural employees is much worse than the average of national economy in Hungary and the European Union as well. In Hungary, the share of the agricultural employees in the younger age categories (15-24 years old) is 1.2 percentage point lower than that of the employees in national economy. In the older (over 50 years old) age group the rate share agricultural employees is 8 percentage points higher than in the national economy (Fig. 3).

The age structure of farm managers¹ was uniformly examined in the commodity producer holdings over EUR 4000 Standard Output (SO) based on the data from Farm Structure Surveys because of the economic thresholds and the different structural features of the Member States. In parallel to the processes farm concentration the age structure of farm managers is less favourable compared to agricultural employees. The proportion of people over 55-years was 52.7 per cent in Hungary in 2013, while 40.7 per cent of the farmers belonged to the age group 35-54 and the young farmers under 35 year amounted only 6.6 per cent. Hungary belongs to the Member States with the most disadvantageous age structure of farmers the share of the oldest age groups is lower in the EU-27 than in Hungary.

¹ The examination concerned to the leaders of individuals and corporate farms.

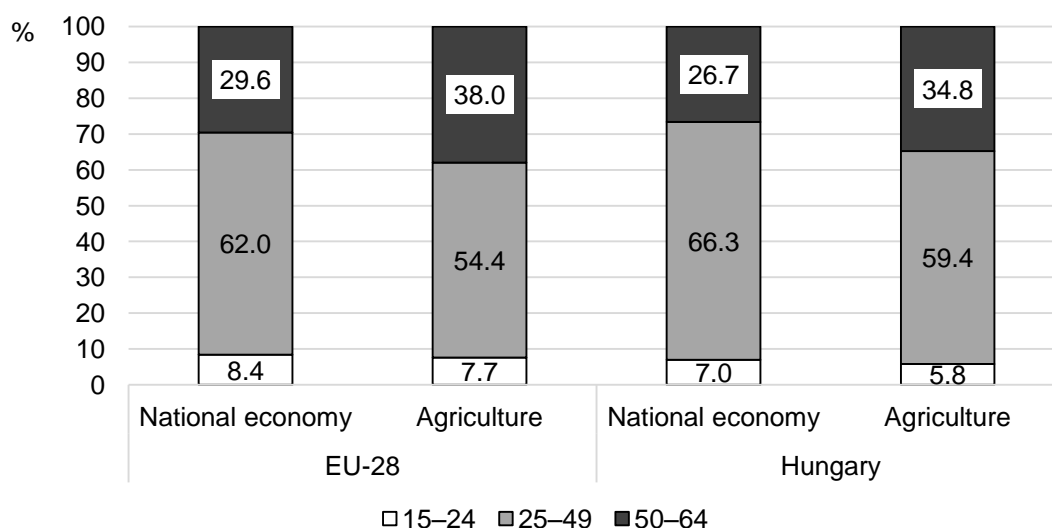


Figure 3. Age structure of the employees in agriculture and the national economy in EU28 and Hungary in 2016.

Source: Eurostat (2017): Labour Force Survey

Considering the changes in the age structure of farmers, Hungary belongs to the countries characterized by strong aging structure where the rate of the young fell, while the share of people over 55-years increased between 2005 and 2013 (Fig. 4.).

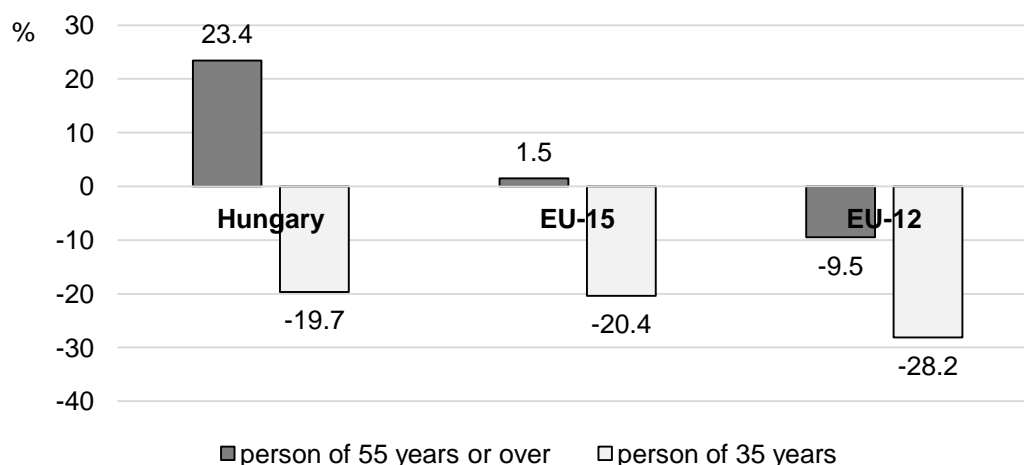


Figure 4. Change of the proportion of farmers 55 years or over and less than 35 years in holdings over EUR 4000 Standard Output between 2005 and 2013, %

Source: Eurostat, 2017.

Hungary suffers from the high proportion of elderly farmers and of the slow generation change. The promotion of young, skilled farmers; the facilitation of start-up their businesses and the reduction of administrative costs connected to this particular change considered to be urgent.

Qualification level

The level of labour skills and competencies are extremely important issues from the point of view of the competitiveness of the agriculture. Since these can be developed through training, we examined the training level of farm managers in farms over EUR 4000 SO in the EU countries similarly to the age structure. There are significant differences among the Member States. The training level of farm managers is the worst in Romania, Greece, Cyprus and Bulgaria among the Member States, where more than 80 per cent of the farm

leaders over EUR 4000 SO have only practical experience². In contrast, the proportion of farm managers with full agricultural training³ is extremely high (above 35 per cent) in Poland, Latvia, Estonia and the Czech Republic. The rate of farm managers with basic training⁴ is higher than average (over 40 per cent) in Italy⁵, the Netherlands, Denmark, Germany, Finland and Slovenia. Hungary is in the middle-field with regard of the qualification level of managers, it is better compared to the average of the EU-12, and however, it is characterized by worse indicators than the EU-15 average. Nearly 55.6 per cent of farm managers over EUR 4000 SO has not received any formal agricultural training, little more than a third has followed some basic and 10 per cent of them has completed a full cycle of agricultural training in 2013 (Fig. 5).

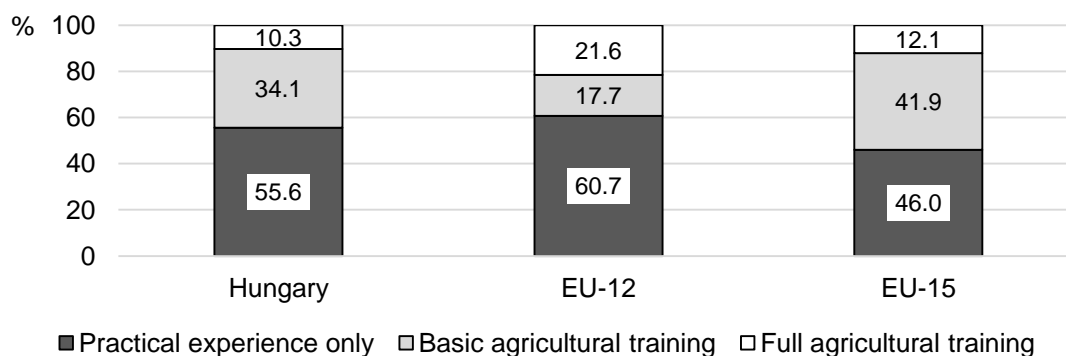


Figure 5. The distribution of agricultural training level of farm managers in holdings over EUR 4000 SO in 2013, %

Source: Eurostat, 2017.

In Hungary the ratio of farmers having basic agricultural training increased significantly (from 10.5 per cent to 34.1 per cent) between 2005 and 2013.

Results of the Agricultural Labour Market Barometer Survey

Human resources demand in food economy enterprises

The survey results confirm the increased demand experienced on the agricultural labour market over the recent years. During the three years preceding the survey 42 per cent of the surveyed 907 holdings recruited employees. Tenth of the newly employed workers was entrant. 72 per cent of the hired labour force is still employed, but the rate is slightly lower in the case of entrants (67 per cent), so a higher proportion of entrants quieted from the holdings surveyed. Agricultural labour market processes in the future are expected to be driven by the fact that a significant part of Hungarian agri-food enterprises – nearly one-third of the enterprises in the sample – have potential for labour expansion. There is a strong

² Practical agricultural experience only: experience acquired through practical work on an agricultural holding (EC, 2013).

³ Full agricultural training: any training course continuing for the equivalent of at least two years full time training after the end of compulsory education and completed at an agricultural college, university or other institute of higher education in agriculture, horticulture, viticulture, silviculture, pisciculture, veterinary science, agricultural technology or an associated subject (EC, 2013).

⁴ Basic agricultural training: any training courses completed at a general agricultural college and/or an institution specialising in certain subjects (including horticulture, viticulture, silviculture, pisciculture, veterinary science, agricultural technology and associated subjects). A completed agricultural apprenticeship is regarded as basic training (EC, 2013).

⁵ In the case of Italy, the definition of "training in agriculture" does not correspond to the content described above. It refers rather to the general education level of the farmer. According to the Italian definition: -practical experience means: the farmer has completed no type of education (primary school, secondary education, higher education); -basic training means: the farmer completed at least primary education, but did not complete agricultural higher education; -full training means: the farmer has completed higher or tertiary education at an agricultural college/university/college -level institute/vocational school (EC, 2013).

positive correlation between the size of enterprises and the number of vacancies: typically, larger enterprises have showed greater potential for expansion. More than half (51.5 per cent) of the companies from the survey searching for employees with „basic” vocational qualification (ISCED⁶ 2-3), 14.8 per cent of them looking for employees with secondary vocational school or technician qualification (ISCED 3-4) and 6.8 per cent searching for employees with higher education (ISCED 5 and 6). In addition, nearly a quarter of the respondents indicated the need for semi-skilled workers which is the most popular job according to their number. There is a long-term demand for meat industry workers and butchers, animal breeder, machinery operators, baker, bakery worker among the agri-food enterprises surveyed. The insufficient availability of skilled labour is considered to be a hindering factor by more than one-third of the respondents, which is a major barrier to the development of a farm/enterprise.

Qualification level of the workforce

The composition of the surveyed farm and firm managers of the food economy according to education and professional training is favorable which can be explained primarily by a sample that consisted farms/firms employing paid labour force. As far as agricultural education is concerned 37 per cent of the respondents have higher education level (ISCED 5, 6 or 7), 37 per cent of them have mid-level (ISCED 3 and 4) qualifications respectively, while a quarter of the managers has no agricultural or food industry qualifications at all. The largest group of employees (32.6 per cent) graduated from vocational schools, 17.7 per cent from secondary vocational education while 7.9 per cent has a high school certificate. Employees with a tertiary qualifications amount for 12.6 per cent in the sample, while the ones completed informal or non-formal education for 9.4 per cent. The fact that fifth of the employees achieved elementary education only, can be considered as a warning sign.

Professional competences of the new entrants

The survey also explored the experiences of the managers of agri-food enterprises on employing recent graduates⁷. The managers particularly missed the professional practical skills, the ability of systems thinking and the existence of economic knowledge from the competencies of young employees. These are the areas which should get more attention in the future within vocational training (Fig. 6). Skill shortage also causes problems not only by the employees but also by a large number of business leaders: there is a theoretical or vocational practical knowledge gap referring to the engineering, technical knowledge, crop protection and fertilization at the largest proportion of them. In addition, language skills; computer and IT skills, administrative and legal knowledge needed for farm management in which the farm managers are lacking.

The primary sources of access to professional information are internet, events organized by professional associations as well as business partners for most of them while traditional information sources (e.g. printed media, professional books and publications) are considered to be relevant landmarks for only a small part of the respondents.

⁶ ISCED: International Standard Classification of Education. ISCED 1: Primary education; ISCED 2: Lower secondary education; ISCED 3: Upper secondary education; ISCED 4: Post-secondary non-tertiary education; ISCED 5: Short-cycle tertiary education; ISCED 6: Bachelor's or equivalent level; ISCED 7: Master's or equivalent level

⁷ Respondents could evaluate the professional competence of the entrants on a four-point scale (1: inadequate, 4: excellent)

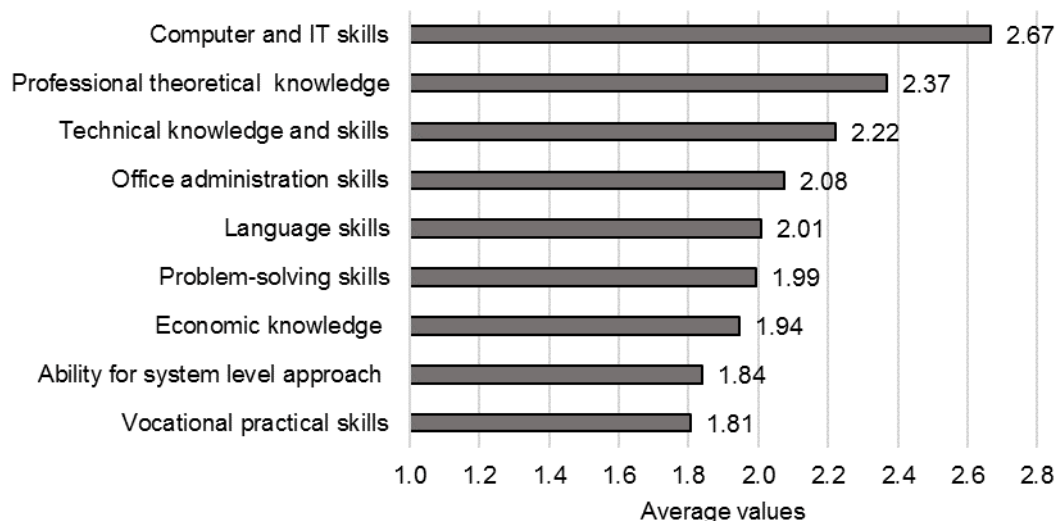


Figure 6. Average values of professional competencies and skills of young employees (1 = insufficient, 4 = excellent)

Importance of the training in the surveyed enterprises

The survey also examined the strategies concerned to the further training of workers employed by the enterprises and the increase of their expertise. It can be generally stated that the surveyed agricultural and food industrial enterprises consider it important and necessary to continuously broaden the knowledge of their workers: 73 percent of respondents support the training of their employees.

Based on the results it can be also stated that the companies mainly provide more accessible vocational trainings for their employees in the framework of non-formal education, with no student status. It is valid for both formal and non-formal education that they are primarily used by enterprises dealing with processing raw materials, characterized by bigger size and are managed by a leader having higher education or qualification. Internal trainings are the most popular ones, implemented by involving proper experts and allowing the targeted delivery of the professional experience accumulated within the company (Fig. 7.).

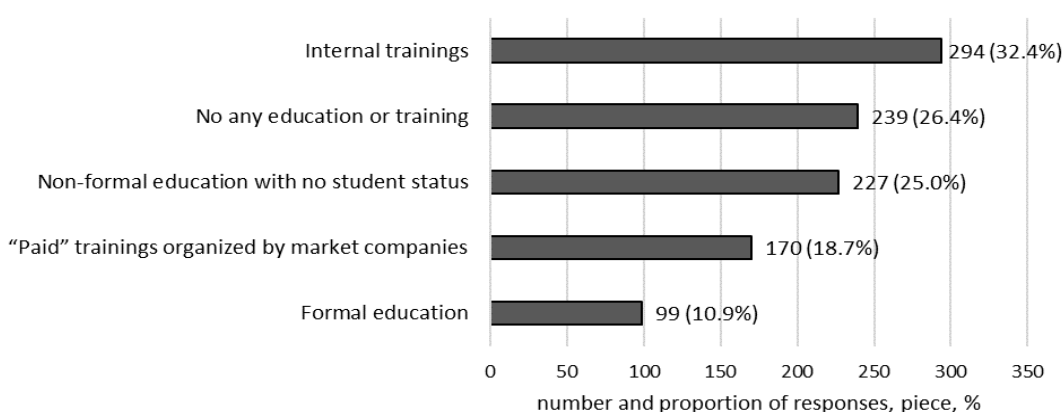


Figure 7. Forms of training of employed workforce among the surveyed firms

“Paid” trainings organized by market companies (integrators, input producers) can be highlighted among non-formal training courses, which are claimed by nearly fifth of the respondents surveyed.

Although most of the agri-food enterprises face labour supply challenges, only a minority of them takes steps by themselves and participates in the dual vocational training system so far. In the three years preceding the survey 18.7 per cent of the enterprises attended

secondary agricultural vocational trainings ensuring apprenticeship contracts and traineeship place. It is encouraging that the training experience clearly increased the participatory activity of the enterprises: the food industrial and agricultural holdings involved in practical training received more students year by year.

Agri-food enterprises already involved in dual training draw up mainly critical reflections in connection to the legal environment, in particular, the relevance and the practical applicability of the concerning legislations as well as the administration of the student contracts cause problem to them. The main reasons for not getting involved in dual vocational training are the following according to the agri-food enterprises: lack of capacity, complicated administration, lack of applicants, lack of information in connection to practical dual training opportunities and a frequent change of the legal environment.

The research also surveyed how managers are satisfied with the preparedness and competences of trainees. Among the nine competency areas listed, the respondents were the most satisfied with the general IT skills: 51.6 per cent evaluated this skill especially good or excellent. The lack of systems thinking, the practical skills and problem-solving skills meant strong problems among the practical skills. The respondents considered to be insufficient the economic knowledge of students, their foreign language skills, as well as the clerical, administrative abilities among the theoretical knowledge particularly.

Practice to motivate workforce

The research has also focused on the assessment of labour incentive tools used in agri-food enterprises. According to the results, 59.0 per cent of the surveyed businesses have used some kind of solution based on the combination of several tools to increase the performance of employees.

In the surveyed agri-food businesses, they have primarily tried to motivate employees by increasing wages; 40.9 per cent of the respondents applied this form of motivation in 2016. In addition, popular incentives were support for commuting (33.2 per cent) and in-kind benefits (26.1 per cent) (Fig. 8).

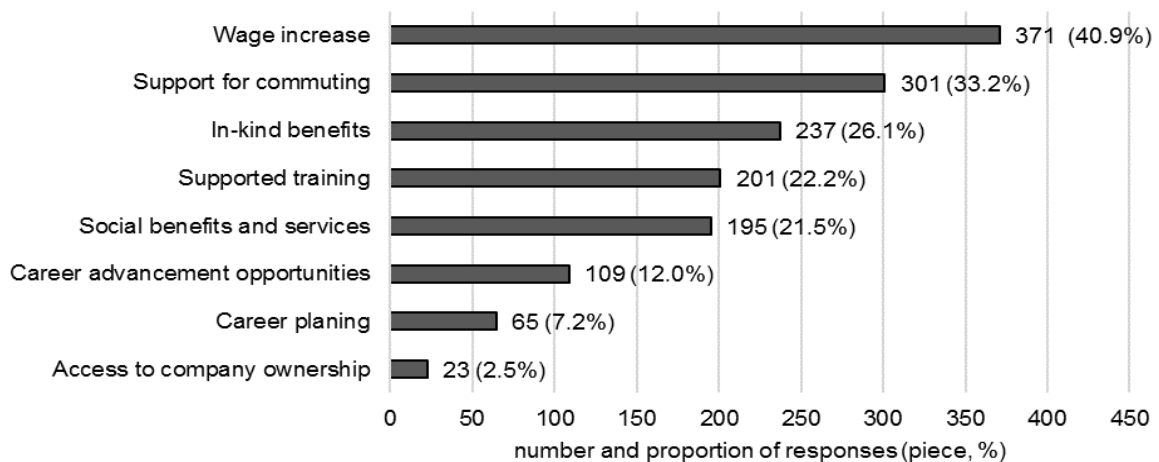


Figure 8. Labour incentive tools applied at the time of the research among the surveyed enterprises

The recognition of the competitiveness enhancing role of knowledge expansion is recognized by the fact that among the types of currently used incentives, the training opportunity provided by the work place was fourth (22.2 per cent) in the line, ahead of the provision of social services (21.5 per cent). The practice of labour incentives is related to the size of company and the sector according to the lesson of multivariate analysis: medium-sized and large-scale companies engaged in horticulture, forestry, mixed farming and food activities used various forms of labour incentives in the largest proportion.

Concerning the sectoral characteristics, traditional labour incentives (e.g. higher wages, social benefits, support for commuting) are primarily used by horticultural, mixed and forestry

farms, more diversified incentives (e.g. life-planning, career advancement opportunities) are more typical for food enterprises (Table 1.)

Table 1. Results of the main component analysis ^{a)}

Variables make up the main component	Communalities
Higher wages	0.376
In-kind benefits	0.386
Supported trainings	0.396
Career advancement opportunities within the organization	0.304
Support for commuting	0.587
Social benefits and services	0.450

Note: ^{a)} Amount of information retained 41.6 per cent.

Based on the cluster analysis and the analysis of clusters with dependent variables, we identified three groups of employers that can be described by the following characteristics (Table 2.):

1. Nearly a third of the enterprises (183 holding) in the cluster analysis conducted conscious labour management, regularly trained their employees, actively participated in youth training, i.e. they participated in dual vocational training as a practical place. These enterprises were typically belonging to holdings having bigger size, larger number of employees and larger production area.
2. Other group of holdings was formed by small-scale enterprises (177 holding) with more qualified managers. They recognized the role of investment in labour for increasing competitiveness and adaptability but their opportunities for development of the labour were limited in terms of their size.
3. The third group of businesses (289 holding) were operated by a leader who was less skilled than the average and the development of the labour was subordinated among the development aims at the holding level.

Table 2. Results of cluster analysis

	Values of cluster centres		
	1	2	3
Applying incentives main component	-0.238	-0.019	0.345
The highest qualification of the leader	-0.903	0.913	0.934
The highest agricultural qualification of the leader	-0.932	0.639	0.862
Age of the leader	-0.040	-0.995	0.865

	1	289
Clusters	2	177
	3	183
All participants		649
No data/no answer		258

Classification of food businesses into clusters provides an opportunity to identify several strategies for human resource management, including development needs to agricultural training and higher education. The establishment and development of an adequate human capital background primarily faces with remarkable difficulties in smaller enterprises run by leaders having a lower than average level of education, so this target group requires mostly the development of a customised support and mentoring toolkit.

Conclusion

Our paper analysed the current situation of the labour market and examined the experiences and expectations of employers regarding the qualifications and competences of employees in the Hungarian food industry.

The analysis of the agricultural human resource background points out that Hungary faces greater challenges than most EU countries in terms of agricultural labor supply. On the one hand, the employment share of agriculture has increased almost only in Hungary over the last decade among the EU member states. On the other hand, the age structure of the farmers is less favorable than the EU average and the level of the training of the farmers is also far below the EU average.

The results of the survey carried out among food industrial enterprises show that in the majority of the business leaders realized the competitiveness increasing role of the development of human capital. There is a clear demand for directly useable, practice-oriented knowledge in the production processes. There is an increased demand for the acquisition of needed vocational practical skills in the dual training according to the leaders' feedback, while only few managers feel compelled to provide traineeship place in the framework of apprenticeship contract.

Hungarian agri-food enterprises are mainly involved in dual training due to fulfil their labour needs, the training of the potential workforce and to start their career, however, financial factors like cheap labour and benefits, encourage moderately the entry into practical training at the same time. The main reasons of those enterprises, which are not getting involved in dual vocational training, are the following: lack of capacity, complicated administration, lack of applicants, lack of information in connection to dual training opportunities and a frequent change of the legal environment.

The following suggestions can be raised based on the results of the survey:

- To simplify the legislation is regulating the participation in practical training and administration, to make the dual training system more flexible.
- To increase the interest of businesses and to motivate their participation in dual training, but it is also important to check their commitments increasingly.
- To increase practical training time in the vocational training.
- To update teaching syllabus to meet technological, environmental and social challenges.
- To strengthen professional requirements.
- To increase the level of knowledge of the teachers and trainers, to introduce them new innovative methods and to strengthen their motivation.
- To develop up-to-date, vertically structured, central practice centres for presenting the newest technologies.
- To strengthen partnerships and cooperation between schools – schools and schools and businesses

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