Competence requirements and skills gap in Hungary and in different regions of Europe by enterprise size

Ilona Cserháti

(corresponding author)
Corvinus University of Budapest,
Institute of Data Analytics and
Information Systems,
Hungary
Email:
ilona.cserhati@uni-corvinus.hu

Tibor Keresztély

Corvinus University of Budapest,
Institute of Data Analytics and
Information Systems,
Hungary

Tibor Takács

Corvinus University of Budapest,
Institute of Data Analytics and
Information Systems,
Hungary

László Trautmann

John von Neumann University,
Faculty of Economics and Business,
Kecskemét, Hungary

Employer expectations can vary significantly according to the region, the size and the activity sector of the company, and in some cases, they are pretty far from actual competences of workers. The latter phenomenon is the skill gap problem, which manifests in slightly different ways according to the size of the company. Our paper compares the expectations of employers in European countries, and uses cluster analysis to map the differences among them. It was found that there are characteristic differences in the main European regions concerning the employers' expectations, and the catching-up countries including Hungary are separated from the developed ones. The differences refer to the lack of innovation and flexibility in the catching-up countries. This suggests that the skill gap in terms of innovation in catching-up countries is less pronounced, the innovation gap starts already at the level of expectations. The research suggests that the catching-up process could be effectively facilitated on the labour demand side by the creation of new types of jobs requiring ability of problem solving, employees' autonomy, continuous development of skills, and flexibility. Hungarian jobs were found to be simpler and less flexible, with less need for autonomous problem solving and decision making. This lag is deeper among the small companies.

Introduction

The skill gap is the gap between the competences of workers and the expectations of employers. This is particularly the case for young workers leaving school and entering the labour market for the first time and facing any employer expectations. Job market expectations relate partly to knowledge and skills in a particular field and partly to the

ability to work collectively, interact and communicate (hard and soft skills). The relevance of the soft skills has increased because of the surge of the knowledge-based economy which means not just the producing of knowledge as a main engine of economy but to spread the knowledge to the consumers and all producers. Beside it, the knowledge-based economy contains incentives in order to reveal the tacit knowledge hidden in every producers. The aim of supporting the soft skills is to adjust the economy into this era. Employer expectations show some similarities in different regions of the world. Due to differences in levels of economic development, cultural and historical traditions, attitudes and mindsets, these expectations can vary significantly from region to region and from country to country. The skills gap problem also manifests itself in slightly different ways according to the size of the company.

The first purpose of the present study is to examine if there are significant differences in employers' expectations in different regions of Europe. There are both developed and catching-up economies in Europe. The innovation plays an important role in the catching-up process, therefore the main focus of the paper is the analysis of the innovation related expectations. The second purpose is to analyse the employers' expectations, in particular the innovation related expectations in Hungary. Hungary is one of the catching-up economies. A key question is how important the ability is to innovate required by the employers. The main motivation for the research is that the Hungarian economy is lagging behind the advanced economies not only in terms of innovation output but also in terms of employers' innovation expectations. The third purpose is to compare the Hungarian young graduates' expectations about the jobs with the employers' expectations based on available survey data. The authors are not aware of such regional comparisons for the European regions. The regional analysis is based on cluster analysis drawing on data from a European-wide survey. The analysis of the Hungarian situation is based on a special domestic survey of employers and of recently graduated young employees. The research sought to highlight a novel factor in regional differences in firm productivity. The basic hypothesis is that in regions with higher productivity, management inevitably expects continuous improvement of skills and flexible adjustment, so that employers in more developed regions typically seek autonomous employees capable of independent problem solving. The novelty of the research is that it provides quantitative evidence that expectations about the characteristics of jobs already differ significantly by level of development and may therefore play an important role in the development of productivity differences.

First, the literature relevant to the research is overviewed and the hypotheses are formulated, followed by a description of the databases and the methodology. Then, the main results are presented and discussed, and finally, the main conclusions are summarised.

Literature review and research hypotheses

Skills and skill gap

From the 1980s onwards, Europe faced increasing competitiveness challenges, particularly in relation to the United States. Reasons for this lag included the lack of a common European labour market, compounded by the inflexibility and opacity of European training systems, their lack of market orientation, and difficulties in establishing a uniform and mutual recognition system for academic achievements and diplomas in the EU. Together, these restricted the students' and labour mobility and the spread of research and innovation. At the end of 1979, 26 European countries, including Hungary, signed the UNESCO Convention on the Recognition of Studies, Diplomas and Degrees concerning Higher Education in the States belonging to the Europe Region in Paris. It has become more and more evident that European tertiary education has to respond to the changing socio-economic needs and challenges of the knowledge society as a result of globalisation. The European Commission, the Council of Europe and UNESCO have played a key role in taking the first steps.

In a global knowledge economy, integration of education systems is not enough, the quality of the knowledge provided by higher education should be analysed in a broader sense through competency assessments. Competence is the set of skills needed to make decisions, implement and achieve results.

Components of competence:
- knowledge, skills,
- skills-abilities,
- personal values,
- attitudes,
- personality,
- motivation.

The global competence is a multidimensional knowledge, opportunity. Globally competent people are able to explore issues locally, globally and interculturally, understand and appreciate different perspectives and approaches, interact successfully and respectfully with others, and take responsible action for sustainability and collective well-being.

Since the early 1970s (Berg 1970), there has been a significant literature on the skills gap, focusing mainly on employers' expectations of young graduates. A common problem in virtually all regions of the world is that young graduates lack, or are unable to fully meet the expected soft skills in particular (Abbas–Sagsan 2020, Arvanitis et al. 2022, Belwal et al. 2017, Capelli 2015, Cinque 2016, Jackson 2016, Matsouka–Mihail 2016, McCracken et al. 2016, McGunaghle–Zizka 2020, McMurray et al. 2016, Moore–Morton 2017, Oviawe et al. 2017, Pang et al. 2019, Sarkar et al. 2016, Schwieger–Ladwig 2018, Stevens–Norman 2016, Succi–Canovi 2020). Hard skills are understood as generic knowledge, see Belwal et al. (2017), i.e. the set of professional skills that are indispensable for the practice of a given profession. Soft

skills are not narrowly defined generic skills that are essential for successful work, such as communication skills, teamwork skills, flexibility, proactivity, etc. For a detailed list of interpersonal and intrapersonal soft skill types, see Arvanitis et al. (2022). The fundamental reason for the skill gaps is the science-focused, individualised nature of university education, which favours the development of hard skills. Matsouka–Mihail (2016) notes that young workers tend to overvalue themselves, presumably considering hard skills as an „important" competence. To bridge the skills gap, university education needs to be partly restructured, possibly involving prospective employers and/or the workplace needs to facilitate the development of such skills. One such institution could be the UNESCO-supported Technical Vocational Education and Training (TVET), see the experience in Nigeria in Oviawe et al. (2017). Most of the studies focus on the experiences of medium and large companies where there is HR capacity to train young people, to provide after-school care. However, the skills gap problem also exists for micro and small enterprises, although the priorities for skills may vary according to size categories. In the present study three size categories are distinguished.

Innovation gap

The role of innovation is key in catching-up and emerging market economies. Young graduates can play an important role in this, by harnessing their skills. Succi–Canovi (2020), based on German and Italian surveys, found that the skill of creativity/innovativeness was slightly more important to employers than it was to young workers, but ranked only in the middle of the list of skills surveyed. A survey by McGunagle–Zizka (2020) in the US showed that STEM (science, technology, engineering, and math) students are expected to be innovative. A survey of Pang et al. (2019) in Hong Kong found that creativity/innovativeness was higher than average for the expected skills, but not in the top third. According to a Greek survey by Matsouka–Mihail (2016), innovativeness is already in the second half of the ranking list of skills sought by entrepreneurs. Authors hypothesize that the valuation of innovativeness as a skill may be related to economic development.

Abbas–Sagsan (2020) applied factor analysis to 11 key employability attributes were grouped into 4 dimensions as knowledge, skills, abilities and professional attitude. Jackson (2016) also used the factor analysis together with structural equation modelling to identify factors which influence the skill transfer process.

One can obtain detailed information on the innovation output and potential of European countries from the European Innovation Scoreboard, which classifies EU countries into four categories based on innovation performance: innovation leaders, strong, moderate and emerging innovators. Most of the provided 32 indicators in the four dimensions are results of official statistics or sample surveys. Countries in each category tend to belong to the same geographic region, and the scoreboard indicators show a strong positive correlation with economic development. Countries of

Northern European are typically leading innovators, while Mediterranean countries and countries of Central and Eastern Europe, which joined the EU in 2004, are in the moderate and emerging categories, respectively[1]. The lag in innovation in catching-up economies is holding back productivity growth and the catching-up process itself. However, foreign direct investment (FDI) makes a limited contribution to technological development, as it is mainly export-oriented, low value-added activities based on external inputs rather than research and development (R&D). Institutional constraints and a regulatory environment that provides little incentive for innovation are the main reasons cited for the persistent technological and productivity gap, followed by a lack of resources.

Institutional barriers can create a middle innovation trap in catching-up economies, see Lee et al. (2021). However, in a supportive environment and under the right conditions, latecomers can even catch up rapidly in innovative sectors by leapfrogging and not investing in earlier technologies, see Lee (2021). Nguyen–Jamarillo (2014) emphasize that, if the environment is not very supportive of technological innovation, and/or the prospects for returns are poor, then firms are inherently less likely to innovate. This may include that employers do not attach enough importance to their employees being creative, ambitious, professionally autonomous and digitally literate, who are constantly improving their professional skills. The scoreboard contains relatively little information on the human conditions for innovation. The share of scientifically qualified people, the number of scientific publications, reflecting the science-pushed conception of the scoreboard, and lifelong learning, the digital literacy indicator, the number of people employed in knowledge-intensive sectors and the number of people employed in innovative enterprises are among the objective indicators. Expectations may also differ by size of firms: Stanislawski et al. (2019) analysed the low innovative propensity of small and medium-sized enterprises (SMEs) in the Polish economy.

Job expectations of employees and young graduates

For a successful understanding of the competence expectations about the workforce, it is essential to look at „the other side", i.e., the expectations of the employees. The trends of these expectations suggest radical changes that are likely to affect all employers in the future.

Analyses of the workplace of the future feature prominently in current economic research and literature, with many studies trying to predict how the characteristics and content of work will change over the next decades regarding the extension of digitalisation, robotization and industry 4.0. As a part of this process, expectations on human capital are also changing, new types of skills and competences are being valued or becoming inevitable as a result of the intensive expansion of the AI. The demands

[1]See the results of 2023 on [1].

of this „brave new world" from the part of employers are relatively well defined and the training systems have begun to be adapted accordingly.

Research has focused on employees' expectations of jobs in the last few years, whereas previously supply and demand-based approaches dominated. In these models, expectations are primarily financial, with workers determining their labour supply on the basis of equilibrium wage levels. Nowadays, more sophisticated approaches have become prevalent, based on the assumption that, in addition to the material demands, other expectations may also be equally important. According to Fodor (2015), firms need a combination of HR, brand building and image management to find, retain and motivate the right people, followed by financial rewards.

Moreover, employees' expectations are extremely heterogeneous. Nelson–Braekkan (2017) focus on the specific needs of Generation Y. In their view, this generation, also known as the millennials, are more selfish and opportunistic than previous age groups. For them, career comes first, family life comes second. As a result, many of them are loners, and many of them are still living with their parents at the age of 30 or 40. The opportunity for continuous progression and a visible career path is very important for them. Lazányi (2014) adds that Generation Y members are eager for the immediate success and financial advancement. A special feature of the Central and Eastern European region is that the entry of the millennial generation into the labour market coincided with the dominance of multinational companies in labour market, so this age group identified most strongly with the world of multinationals and their patterns of behaviour. Törőcsik (2003) adds that labour market trends have fundamentally changed as a result, with the digital natives of Generation Y behaving much more individualistically than their elders, both in the workplace and in terms of consumption.

Nelson–Braekkan (2017) compare the expectations of Generation Y and Z. Members of Generation Z born after 1995 are only now entering the labour market, but their new type of expectations is already starting to change employers' attitudes. For them, it's no longer about financial rewards and vertical career opportunities, but about professional success, a good working atmosphere and environment, and work-life balance. However, according to Ferri-Reed (2014), they are similar to the previous age group in that they also tend to have unrealistic expectations about career advancement opportunities, and they do not respect authority.

Several authors underline that the understanding of the employees' expectations is a crucial task for employers, because if the reality falls short of these expectations, the productivity of a company can drop significantly, see Herriott et al. (1997), Robinson–Morrison (1995), Rousseau–Tijoriwala (1999) or Turnley–Feldman (2000).

Sullivan (2004) points out that employee branding is a feature of a wide range of companies, as the communication of corporate culture and values is an important element of recruitment and attracting the best employees. Bartók–Mitev (2018)

underline that the external image of a workplace and the actual experience often differ. This variation can be positive or negative, but in almost all cases it affects employee performance, see Lievens et al. (2007). Before the rise of social media, this kind of information asymmetry basically favoured employers, but now it is common for not only consumers but also employees to share their experiences on these platforms, see Berthon et al. (2012). It follows that in the current situation, it is not only the building and communication of the employer brand that is becoming a priority, but also its credibility, reliability, and sustainability.

Research hypotheses

Specifically, to analyse the employers' expectations and the skill gap problem in Europe and in Hungary, the following hypotheses are set up:

- H1: Employers' expectations differ significantly across European regions (continental, Mediterranean, Nordic and eastern regions).
- H2: Countries that joined the European Union after the turn of the century (ex-Soviet bloc countries) may show similarities and differentiate themselves from the group of economically more advanced member states.
- H3: The largest difference between job expectation in Hungary and in the most developed economies is caused by the lack of innovation and flexibility.
- H4: In Hungary, small enterprises have the least innovation-oriented expectations.

Data and methods

European Company Survey of the Eurofound

For the analysis of employers' expectations about employees and for the international comparison, data from the fourth European Company Survey (ECS) 2019 by Eurofound and Cedefop were used on competences expectations. The survey covered the EU-28 countries, including UK. Around 20,000 enterprises were surveyed on human resource management, skills utilisation, skills development strategies, digitalisation, direct employee involvement and social dialogue. The results of the survey are available in aggregate and by size category.[2] The size categories were:

- small business: 10–49 employees,
- medium business: 50–249 employees,
- large business: 250 or more employees.

---

[2] Note that the full database of the Eurofound Fourth ECS Survey 2019 was not available in a processable format (SPSS), the relevant data for the analysis was extracted from the data visualisation query system on the Eurofound website, and used to create our own database for the analysis.

For small enterprises the database was complete, while for medium-sized enterprises only Cyprus was missing. For large enterprises, data are available for only 13 EU member states – Austria, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Italy, the Netherlands, Poland, Romania, Spain, and Sweden. Data for the United Kingdom, which has since left the EU, are not included in the analysis.

Most of the questions in the survey that could be considered to be relevant concerned on the percentage of certain conditions being met, or more precisely the percentage of conditions falling within certain ranges. The class ranges for all questions were uniformly: above 80%, 60–79%, 40–59%, 20–39%, less than 20%. Respondents were asked to answer the following questions.

- What percentage of your employees have the skills required for their job?
- What percentage of your employees have a higher level of competence than required by their job?
- What percentage of your employees have a lower level of competence than required by their job?
- What percentage of your employees require continuous training to perform their job?
- What percentage of your employees have limited opportunities for further training?
- What percentage of your employees have a job that involves some problem solving?
- What percentage of your employees are able to manage their own working time and plan their own tasks?
- What percentage of your employees have their workplace determined by machines and computers?
- What percentage of new recruits do not have the skills they need to do their job to the required standard?

For the other group of the questions, certain categories were expected in the survey. The following questions were selected from this group:

- How quickly are the competences and skills expected of employees changing in your company? (Very quickly, quite quickly, not quickly, not at all.)
- Job complexity and employees' autonomy. (High complexity and autonomy, partial complexity and autonomy, instruction and direction based).
- When recruiting new staff, how often does management try to assess whether there is a suitable internal worker to fill the job? (Always, most of the time, sometimes, rarely, never.)

Survey of Hungarian employers

Since the ECS does not contain data on large Hungarian companies, also another survey data of employers was added and used for the analysis. In this Hungarian

domestic survey 270 enterprises/employers were conducted in 2019 in the framework of a project supported by the European Social Fund[3]. This sample included 115 small, 121 medium sized and 34 large companies again with 10–49, 50–249, and at least 250 employees, respectively.

The following dimensions were surveyed by size category:
- profitability, market position,
- co-operations, networking,
- participation in R&D,
- innovation, new products/services,
- digitalisation, management commitment to digitalisation,
- flexible forms of working, organisational culture,
- training and skills.

The respondents were also asked to rank the following job types according to their preferences:
- Type A: tied work schedule, salary closely linked to the position in the hierarchy, individual responsibility dominates, employee's qualifications and professional knowledge are the most important.
- Type B: semi-flexible working hours, demand for work, alternative career paths, individual and group work are important, ability to adapt to constantly changing conditions.
- Type C: creative work, minimum link between career and position in the organisation, completely informal, autonomous work, high level of language skills, international mobility.
- Type D: expected to be constantly available, well above average remuneration, identification with company values, loyalty to the company, ability to work in a team.

Methodology

The cluster analysis seems an adequate tool to analyse the data. The dimension of data are all proportions, showing a relatively high variation. The coefficient of variation has been calculated for all questions and for all size categories. Its value was above 10% 45 times out of 48, and was above 50% 12 times.

The unit of measure is the same for all the variables. The proportion type causes that the distribution of the variables is not far from the spherical. An important consequence of the common type of variables is that the empirical variances are similar. Each cluster has roughly same number of observations.

There are basically two broad groups of clustering procedures. In the case of hierarchical clustering, the number of clusters to form is not predefined. In this procedure, the start of the procedure is the whole set, which is considered as one large

[3] No. 3.6.2-16-2017.00017.

cluster. In our study we used another type of clustering procedure, k-means clustering. The idea is to predefine the number of clusters to be formed (k) and to use the optimization procedure to form clusters that are as different as possible from each other, while the individual clusters themselves are as homogeneous as possible. To implement the procedure, a metric has to be chosen to determine the distance between two observations in the multidimensional space of variables. The most commonly used solution for this is the Euclidean distance calculated on standardized variables, which is the one that was chosen. In addition, a distance definition must be chosen, which makes it possible to apply the chosen metric to a set of observations. There is no obvious choice, the most commonly used solutions being the nearest neighbour principle and the centroid method. In the former case, the distance between two sets is defined by calculating the Euclidean distances for all pairs of observations, and then taking the smallest value as the distance between the two sets. The centroid method consists of calculating the arithmetic mean of the sets for all variables and treating the resulting vector (centroid) as a normal set of observations. The distance between the two sets is therefore the distance between their centroids. In this paper the centroid method is applied.

The first step in k-means clustering is to randomly select k observations from the set. As a starting point, they form k clusters. Then each missing element is taken one by one, assigning it to the cluster it is closest to. This involves recalculating the centroid of the clusters at each step if an element has been added. After each observation has been clustered, it has to be checked again for each point to see if it is in the cluster closest to its centroid. If not, the observation is reclassified to the corresponding cluster. If there has been at least one such reclassification, the previous step is repeated. The procedure ends when there are no elements to be reclassified, since then everyone is included in the cluster to which they are actually closest.

Since the computational complexity of the procedure is very high, certain convergence criteria are usually used in practical solutions. The idea is that these reclassifications only actually take place if the element is not only closer to another cluster, but this advantage is above a minimum value (convergence criterion). In other words, convergence can be considered complete if certain points are closer to another cluster, but the degree of convergence is very small. This addition greatly facilitates the practical feasibility of clustering, and avoids cases where minimal shifts increase the running time by a factor of several times, which do not change the final result significantly.

The ECS survey data contained primarily qualitative variables. For each question of the ECS, the distribution of responses for each category by size of enterprise is given for each country. These are standardised to the interval [0;1]. In the case of quantitative (percentage) categories, for each question, values of 0.1, 0.3, 0.5, 0.7 and 0.9 were assigned to each category for each country „from the bottom up", weighted by their respective distribution values and then divided by 100. For the qualitative

categories, there were ordinal measurement level categories, so for four of these categories the values of 0, 1, 2, 3 „from the bottom up" were assigned, weighted them by the distribution ratios and then divided by 400. (Logically, for the three category questions the values to be weighted were 0, 1, 2, then divided by 300). So, having the distributions of responses, a data matrix was obtained by country and by enterprise size category (rows correspond to countries, columns to questions), and also the data matrix for enterprises by country together was produced.

Main results

As mentioned in the previous subsection, 2–2 cluster analyses were made for 4 (sub-)populations, giving a total of 8 outputs. A ninth cluster analysis was added, because for the large companies there were only 12 observations, so it seemed to be rational to repeat the analysis using only 2 clusters. The cluster memberships obtained in the analysis are shown in Table 1. The database was not complete, so the table shows in red the missing data, i.e., the countries that were not included in the survey in the given category. Figure 1 shows the flexible and innovative skill-intensity in the European countries in such a way that the four clusters for all enterprise sizes are ordered by the average economic development.

When defining the ideal number of clusters, it was tried to meet the usual (soft) requirements, i.e., neither too many nor too few clusters, preferably no single-person clusters, avoid dominant clusters (containing a large part of the population), and to form well-understood clusters.

For small and medium size companies, 4 clusters were chosen as the most appropriate, and 3 clusters were determined for large companies. Regardless of the number of clusters, it was observed that for some variables there were no significant differences between the means of the groups. An example can be found in the first 3 questions, which asked whether the employees' qualifications correspond to the job they hold.

The largest differences between the clusters were found for the following questions:
- What percentage of your employees have a job that involves some kind of problem solving?
- What percentage of your employees can manage their own working time and plan their tasks?
- The complexity of jobs and employee autonomy.

Table 1

## Clusters for the whole dateset and by enterprise size category

Company size in terms of employees			
small (10–49)	medium size (50–249)	large (250–)	all (10–)
Denmark	Denmark	Finland	Denmark
Finland	Finland	Sweden	Finland
Luxembourg	Sweden	Austria	Luxembourg
Sweden	Austria	Czech Republic	Sweden
Austria	Belgium	Denmark	Austria
Belgium	Czech Republic	France	Belgium
Estonia	France	Germany	France
France	Germany	Netherlands	Germany
Germany	Greece	Bulgaria	Italy
Hungary	Italy	Estonia	Malta
Italy	Latvia	Italy	Netherlands
Malta	Luxembourg	Poland	Republic of Ireland
Netherlands	Malta	Romania	Slovenia
Portugal	Netherlands	*Belgium*	Bulgaria
Republic of Ireland	Portugal	*Croatia*	Czech Republic
Slovenia	Republic of Ireland	*Cyprus*	Estonia
Bulgaria	Slovakia	*Estonia*	Latvia
Croatia	Spain	*Greece*	Lithuania
Cyprus	Bulgaria	*Hungary*	Poland
Czech Republic	Croatia	*Latvia*	Portugal
Greece	Estonia	*Lithuania*	Slovakia
Latvia	Hungary	*Luxembourg*	Spain
Lithuania	Lithuania	*Malta*	Croatia
Poland	Poland	*Portugal*	Cyprus
Romania	Romania	*Republic of Ireland*	Greece
Slovakia	Slovenia	*Slovenia*	Hungary
Spain	*Cyprus*	*Slovakia*	Romania

Note: different background colours identify the individual clusters: yellow indicates the leading, reference category, green indicates the developed category, orange indicates the catching-up category, and light brown indicates the lagging cluster. ECS survey data are not available for countries marked by italics. Red letters shows the missing data, i.e., the countries that were not included in the survey in the given category.

Source: [2] and own computation.

Figure 1

Flexible and innovative skill-intensity in the examined European countries
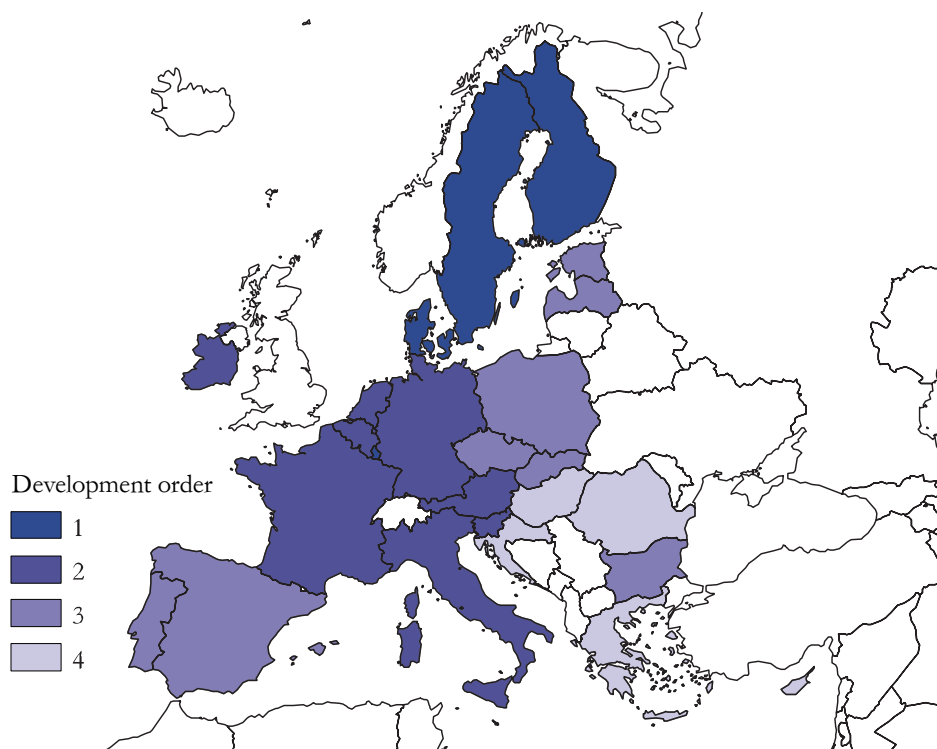
Source: [2] and own computation.

So, these questions were the most suitable to identify the common characteristics of the countries in each cluster. These questions mainly asked about the competences that fit the latest workplace expectations, maybe one could say that they are typical characteristics of the workplace of the future. In short, the most important change in the labour market of the last 50 years, that instead of the repetitive, routine activities the autonomy and creativity are needed in the majority of workplaces. A higher score on these questions indicates a stronger compliance with this requirement, i.e. clusters with a higher average score have a more developed labour market in this respect.

For small firms, the most progressive group is Denmark, Finland, Sweden, and Luxembourg. They can be called as the „reference cluster", which can be a model for the others, or in other words the „leaders" for the other countries, the pattern to follow. The members of the next cluster are the least lagging behind the „leaders", they are called „advanced". The next cluster includes the „catching-up" countries, and finally, the last cluster contains the „lagging" countries.

For medium-sized companies, the group of leaders is limited to Denmark, Finland, and Sweden, with Luxembourg moving into the advanced group. In this size category the difference between the catching-up and the lagging countries is significantly smaller than in the previous size category. Overall, cluster membership is very similar to the case of small firms, the majority of countries remains in the same cluster as in the previous case.

For large companies, cluster analysis could only be carried out only for 13 countries for the lack of data. 4 clusters would have been too many in this round, 3 clusters were considered the ideal choice. The leader group in this case only includes Finland and Sweden. They are followed by the next cluster, with a significant gap, so it is perhaps better to keep the catching-up category and leave out the advanced group. The members of the last cluster are at a serious disadvantage even to the catching-up countries, so the term laggards may be really eligible for this group of countries.

After making the cluster analysis for all companies the members of the leading group are the same as in the analysis for small companies, the elite group includes Denmark, Finland, Sweden, and Luxembourg. The next cluster is the advanced group again, which is also similar to the results for small firms. However, the characteristics of the catching-up and lagging countries are more similar to the results of medium-sized companies: there is a small difference between these clusters.

- The cluster analysis showed that there are significant differences between the European countries in every company size category that confirms hypothesis H1.
- The catching-up countries have been separated confirming hypothesis H2.

The cluster means also contain important information; they refer to the lag behind the more advanced group. Looking separately at the Hungarian average both the distance from the advanced group average on the one hand, and from the own cluster mean on the other were analysed. The cluster means of small enterprises together with the Hungarian average are shown in Table 2. Significant differences between the clusters can be observed mainly for questions 4 to 10. Competence expectations change fastest in the most advanced cluster (question 4). The averages of the other three clusters are not significantly behind, but the Hungarian average is even lower than its own cluster mean. Market expectations of Hungarian small businesses' products and services are relatively rigid by international standards, which may indicate that they feel less pressure to innovate and innovate continuously.

- The above results confirm the statement of hypothesis H3.

The next question asked about the percentage of participants in continuous competence development. As before, the most developed countries have the highest cluster mean. The average in the other clusters is significantly lower on this question – one can see roughly equal values –, but the Hungarian average is about 20% below even the mean of the own cluster.

Continuing training is a cost for the business, and one that the smallest businesses are less willing to bear. This may suggest that the domestic environment does not enforce innovative, flexible change, so small entrepreneurs are less likely to find continuous training a worthwhile investment. The lower value for the sixth question is more favourable, as it asks about the proportion of workers for whom the job is a barrier to learning new skills. Here again, the reference group has the best score. In terms of cluster means, the gap is particularly noticeable for our cluster, the fourth, but our national average is also slightly worse than our own cluster mean. In small enterprises, workers are therefore mainly employed in low-changing, routine jobs.

- The results concerning the Hungarian small companies confirms hypothesis H4.

In question 7, respondents were asked what percentage of employees need problem solving in their job. Again, the most advanced group clearly outnumbered the others. The average of the other three clusters is roughly the same, but the relative position of the cluster containing Hungarian small enterprises is slightly more favourable, and the Hungarian average is even slightly higher than the average of its own cluster. This may of course raise the question of how respondents interpret the problems to be solved: performing routine activities could also be considered problem solving. The next question concerned the autonomous allocation of working time. Here, the average of our cluster is relatively low compared to the reference group, but the national average is below it: it is about the same as the average of the cluster of mostly former socialist countries. So small businesses in our country also have roughly the same kind of autonomy. Significantly worse scores are found in the cluster representing Spain, Estonia and Slovakia. The ninth question concerned the dependency of the pace of work on machines (including, of course, computers). This question was also assessed as having lower values, where the use and exploitation of machines is more efficient. The average of our cluster is slightly below the corresponding value of the reference group, but the national average is further behind our own cluster mean. Here again, the Hungarian value is roughly close to the cluster mean of the former socialist countries, the „developing" ones. The last question concerned the complexity of the activities and the autonomy to carry out the tasks. It was perhaps unfortunate to combine these two criteria into one question, but in any case, the most advanced ones have a very high score compared to the others. Here, our cluster lagged behind the first cluster of four countries and the third cluster of developing countries, but Hungary did not reach its own cluster mean, which suggests, as before, that domestic small enterprises are mainly engaged in the production of standard products and the provision of standard services.

<div align="right">Table 2</div>

Clusters, cluster means and Hungarian averages based on survey data of small enterprises (10–49 employees)

Denomination	Clusters				
	reference	advanced (included Hungary)	cathcing-up	lagging	Hungary
1. Percentage of employees that have the skills that are about right to do the job	0.717	0.731	0.682	0.736	0.758
2. Percentage of employees that have a higher level of skills than is needed in their job	0.213	0.197	0.222	0.183	0.172
3. Percentage of employees that have a lower level of skills than is needed in their job	0.170	0.170	0.188	0.178	0.171
4. How quickly do the knowledge and skills needed from the employees in this establishment change?	0.488	0.435	0.460	0.445	0.352
5. Percentage of employees whose job requires continuous training	0.429	0.349	0.339	0.371	0.279
6. Percentage of employees whose job offers limited opportunities to learn new things	0.244	0.304	0.291	0.294	0.335
7. Percentage of employees whose job includes problem-solving	0.504	0.365	0.313	0.303	0.370
8. Percentage of employees whose job includes independently organising their own time and scheduling their own tasks	0.535	0.445	0.365	0.284	0.384
9. Percentage of employees whose pace of work is determined by machines or computers	0.222	0.270	0.326	0.252	0.309
10. Type of establishment – job complexity and autonomy	0.484	0.373	0.294	0.242	0.334
11. Percentage of newly recruited employees that did not yet have the skills needed to do their job to the required level	0.383	0.410	0.417	0.269	0.344
12. When recruiting, how often does management start by looking whether there are any suitable internal candidates?	0.681	0.701	0.611	0.580	0.678

Source: [2] and own computation.

For medium-sized enterprises, the same questions also showed the largest differences in cluster means (see Table 3). Regarding the variability in competence expectations, the clusters have similar averages, and here again the lag between the Hungarian average and the averages of all clusters is striking (question 4). There is also a certain rigidity in the case of medium-sized enterprises. On the issue of continuous training, one can see a similar domestic position as for small enterprises, so even medium-sized enterprises are less inclined to incur such costs. This is also generally the case for the developing cluster, but even compared to these, the national average is still below. In the case of developers, it is striking how much lower the average is for medium-sized enterprises compared to their small counterparts. Hungary is lagging behind developed countries in terms of the barriers to acquiring new skills. For activities requiring problem-solving, relative positions are similar to small firms. For this question, it is striking that the cluster means and the national average are lower than those for small enterprises. In contrast, all values are lower for

the autonomous allocation of working time. This is not surprising, of course, as larger businesses necessarily have a more rigid work organisation and schedule to allow for more effective collaboration. The relative position of individual clusters and medium-sized domestic enterprises is similar to that of small enterprises. The machine-determination of the pace of work is similar to what could be seen for small firms, but the national average is – in this case, disadvantageously – relatively higher than the average for the cluster. For job complexity and autonomy of activity, lower values are observed both at cluster level and for the national average. This is difficult to interpret by conflating the two different aspects. The lower averages are presumably due to the lower autonomy: the complexity of activities is inherently difficult to judge and assess without a proper benchmark.

Table 3

Clusters, cluster means and Hungarian means based on survey data of medium size enterprises (50–249 employees)

Denomination	Clusters				Hungary
	reference	advanced	cathcing-up	lagging (included Hungary)	
1. Percentage of employees that have the skills that are about right to do the job	0.717	0.731	0.682	0.736	0.758
2. Percentage of employees that have a higher level of skills than is needed in their job	0.213	0.197	0.222	0.183	0.172
3. Percentage of employees that have a lower level of skills than is needed in their job	0.170	0.170	0.188	0.178	0.171
4. How quickly do the knowledge and skills needed from the employees in this establishment change?	0.488	0.435	0.460	0.445	0.352
5. Percentage of employees whose job requires continuous training	0.429	0.349	0.339	0.371	0.279
6. Percentage of employees whose job offers limited opportunities to learn new things	0.244	0.304	0.291	0.294	0.335
7. Percentage of employees whose job includes problem-solving	0.504	0.365	0.313	0.303	0.370
8. Percentage of employees whose job includes independently organising their own time and scheduling their own tasks	0.535	0.445	0.365	0.284	0.384
9. Percentage of employees whose pace of work is determined by machines or computers	0.222	0.270	0.326	0.252	0.309
10. Type of establishment – job complexity and autonomy	0.484	0.373	0.294	0.242	0.334
11. Percentage of newly recruited employees that did not yet have the skills needed to do their job to the required level	0.383	0.410	0.417	0.269	0.344
12. When recruiting, how often does management start by looking whether there are any suitable internal candidates?	0.681	0.701	0.611	0.580	0.678

Source: [2] and own computation.

For large enterprises, there were no data for Hungary. Table 4 shows the results of the three cluster runs. Broadly speaking, two developed Northern European countries are separated here (reference group), the continental developed countries are also in one cluster, the others form the developing countries – these are former socialist and Mediterranean countries. Apart from the machine-determined pace of work, there are significant differences in cluster means for the other questions analysed earlier (see Table 4). The rate of change in expected competences is significantly higher in the reference group and roughly the same in the other two clusters. Here, therefore, the developing countries do not lag behind the continental developed countries. However, the differences between developed and developing countries in terms of continuous training are already becoming apparent. There is no difference between continental developed and developing countries in terms of the barriers to learning new things, but here again the advantage of the reference group is clear. Again, the need to solve problems defines three distinct groups: here, the average value of the developers is only half that of the reference group. The same can be said for the autonomous organisation of activities. In terms of the complexity of activities and autonomy, the dispersion between the 3 cluster means is even greater.

Table 4

Clusters, cluster means based on survey data of large enterprises (249– employees)

Denomination	Clusters		
	reference	cathcing-up	lagging
1. Percentage of employees that have the skills that are about right to do the job	0.745	0.731	0.718
2. Percentage of employees that have a higher level of skills than is needed in their job	0.190	0.198	0.198
3. Percentage of employees that have a lower level of skills than is needed in their job	0.175	0.173	0.187
4. How quickly do the knowledge and skills needed from the employees in this establishment change?	0.547	0.499	0.495
5. Percentage of employees whose job requires continuous training	0.526	0.423	0.344
6. Percentage of employees whose job offers limited opportunities to learn new things	0.199	0.298	0.285
7. Percentage of employees whose job includes problem-solving	0.490	0.317	0.246
8. Percentage of employees whose job includes independently organising their own time and scheduling their own tasks	0.481	0.389	0.246
9. Percentage of employees whose pace of work is determined by machines or computers	0.276	0.271	0.322
10. Type of establishment – job complexity and autonomy	0.439	0.326	0.193
11. Percentage of newly recruited employees that did not yet have the skills needed to do their job to the required level	0.239	0.332	0.318
12. When recruiting, how often does management start by looking whether there are any suitable internal candidates?	0.829	0.812	0.695

Source: [2] and own computation.

Table 5

Clusters, cluster means and Hungarian means based on survey data of all enterprises (10–)

Denomination	Clusters				
	reference	advanced	cathcing-up	lagging (included Hungary)	Hungary
1. Percentage of employees that have the skills that are about right to do the job	0.721	0.722	0.681	0.732	0.761
2. Percentage of employees that have a higher level of skills than is needed in their job	0.207	0.202	0.217	0.190	0.172
3. Percentage of employees that have a lower level of skills than is needed in their job	0.171	0.173	0.196	0.175	0.168
4. How quickly do the knowledge and skills needed from the employees in this establishment change?	0.489	0.453	0.435	0.447	0.354
5. Percentage of employees whose job requires continuous training	0.427	0.351	0.344	0.342	0.272
6. Percentage of employees whose job offers limited opportunities to learn new things	0.244	0.298	0.307	0.295	0.331
7. Percentage of employees whose job includes problem-solving	0.489	0.362	0.313	0.297	0.349
8. Percentage of employees whose job includes independently organising their own time and scheduling their own tasks	0.526	0.438	0.332	0.352	0.363
9. Percentage of employees whose pace of work is determined by machines or computers	0.225	0.262	0.358	0.281	0.320
10. Type of establishment – job complexity and autonomy	0.470	0.371	0.279	0.278	0.309
11. Percentage of newly recruited employees that did not yet have the skills needed to do their job to the required level	0.370	0.404	0.328	0.387	0.337
12. When recruiting, how often does management start by looking whether there are any suitable internal candidates?	0.696	0.730	0.696	0.582	0.685

Source: [2] and own computation.

Table 5 shows the cluster means and the Hungarian averages for all size categories together. Here again, the questions relevant for small and medium-sized enterprises are marked as the most interpretable, i.e. the averages with the largest differences. The reference group consists of the northern European countries and developed Luxembourg, which in many respects has specific characteristics (leaders). The non-Nordic developed countries form a separate group (advanced), the majority of the former socialist countries (catching-up) and the group of south-eastern and eastern Mediterranean countries, including Hungary, are the developing countries (lagging). The rate of change in expected competences is highest in the reference group, our cluster is slightly behind the other cluster of non-northern developed and developing countries, but the average for Hungary is much lower than the group average. The rigidity of less innovative operations is therefore not unique to small firms. In terms

of continuous training, the Nordic cluster again performs exceptionally well, with the other clusters showing similar averages, but the Hungarian average is also spectacularly below its own cluster mean. There is therefore relatively little demand and incentive for training in domestic enterprises. Unfortunately, the Hungarian average is also the worst in terms of opportunities to acquire new skills. The need for problem solving is high compared to the reference group and low compared to the non-Nordic developed countries. On the positive side, our average is better than that of the other group of developing countries, and it is also better than our own cluster mean. Here, however, as indicated earlier, it should be borne in mind that the interpretation of the concept is not entirely clear. As regards the autonomous allocation of working time, Hungary is clearly lagging behind the reference group and the developing countries, where our position is similar to that of the other developing countries. This could be an indication that atypical forms of employment are still relatively underdeveloped in our country. In terms of exposure to work pace machines, there is also a noticeable gap with the two clusters of developed countries, but the position of the other developing groups is less favourable. On the issue of complexity and autonomy, which is also difficult to interpret, there is a wide variation according to the level of development. Overall, therefore, Hungarian enterprises are characterised by relative inflexibility, relatively low innovativeness, and less incentives and willingness to finance training.

Based on the international comparative analysis, there are two main areas where the Hungarian labour market is lagging behind:

- continuous and flexible adaptation and training to changing needs (based on the answers to questions 4–6 of [2]),
- in the area of type and complexity of work, i.e. that Hungary has a lower share of jobs requiring a high level of creativity, problem solving and flexibility (based on the answers to questions 7–10 of [2]).

Regarding the domestic Hungarian survey, the breakdown of responses on the *innovativeness* of own business is shown in Table 6. There is a relatively wide variation in the perception of productivity change. As size increases, the perception of productivity change clearly improves. In the two most positive categories (better or much better), the response rate for large enterprises is more than 20 percentage points higher than the corresponding rate for small enterprises, while medium enterprises are around average. Large enterprises are mostly engaged in productive activities, where investments in modern technologies and automation can improve productivity significantly. Respondents' perceptions of innovativeness relative to competitors (typical or fully typical) were similar, although the variation was slightly smaller, with a difference of 17 percentage points between small and large enterprises. Small businesses are likely to have a less realistic view of the operational characteristics of businesses that can be considered competitors. The perception that the business has introduced „a lot of new things" in the last five years was similar for medium and

large businesses, with small businesses being much less sanguine (11% of them rated the question as not relevant in the first place). Of course, perceptions can be highly subjective for this type of question, but the responses still reflect quite clearly that small businesses are most likely to be engaged in standard activities that change little over time or are innovative. The next question asked respondents to rate the statement that they are continuously improving their business. Here again, small businesses seemed to be somewhat behind in their own perception, and only in this category were there responses of „not typical at all". This somewhat contradicts the common perception that flexibility is one of the main positive aspects of small businesses. The last two questions in this block concerned innovative supply and service to customers, since innovation is not only understood in relation to production. Customers and partners are different for small businesses and large businesses, and the nature of the relationship is different. For small businesses, the relationship may be more direct and diverse. In any case, there is little dispersion on these two questions, with small businesses perceiving their situation more favourably than large businesses, and the situation being most favourable for medium-sized businesses.

For the ability to change, four questions were examined (see Table 7). The first asked whether the respondent considered change to be part of the organisational culture. The two most favourable perceptions again show a wide spread, with perceptions improving with increasing size. The difference between the two extremes is around 30 percentage points. It is noteworthy that nearly 15% of small businesses said that this was not true at all, while in the other size category there was no such response at all. The next question showed a similar result. „Your organisation is prepared to constantly change the existing processes" scored slightly higher in all categories, but the order did not change and the degree of dispersion here was also high. There is a slightly smaller spread, but still a significant difference in the continuous search for opportunities for renewal. Thus, the responses suggest that small domestic enterprises do not appear to be flexible, nor do they appear to be interested in any kind of change. The last question in the block asked again to compare your own business with your competitors: 'The capacity for change is more advanced than that of the competitors'. There is a twofold difference between the proportion of small and large enterprises, again in favour of large enterprises.

This block asked for a typical 'hard' feature on the state of *digitalisation* (see Table 8). The first question asked respondents to rate management commitment to digitalisation. Here, it is not surprising that the perception improves with increasing size categories. Raising the level of digitalisation requires investment, and the need and resources for this are particularly strong in larger businesses. The second question differed from the previous one only in whether management actually supports digitisation. The average of the two most favourable answers was almost the same as in the previous question. Engagement is therefore not only at the level of

communication. The greatest opportunity for digital transformation is in large productive enterprises. The third question was whether management really sees digitalisation as a key issue, a strategic priority. For this question, the averages of the two most favourable ratings in each size category were slightly lower than for the previous question, but the order was of course the same and the degree of dispersion was similar. There was slightly less variation for the question on how well management communicates the need for digitalisation to their employees, but the differences are still significant. The last question asked about the extent of digital transformation. The top two or three most popular answers were „above average", „at the forefront" and „leading position". Small businesses are lagging far behind, with 13% saying that their company has not undergone any digital transformation at all – a response that was not found for large businesses, while the figure for medium-sized businesses was low at around 4%. Looking at the three most favourable response options, one can see a difference of around 10 percentage points in the proportions across size categories.

In this block, respondents were specifically asked to rate the *level of training and skills* related to digital transformation (see Table 9). The two questions asked whether existing staff had the skills needed to handle digital transformation and whether they were developing the skills of their employees in this area. Once again, the responses show a wide variation, and unsurprisingly, here too, perceptions are improving among larger businesses, with small businesses lagging far behind. It is noteworthy that the proportion of the top two choices for large businesses with a favourable perception is very high, above 70% for both questions.

Type A and type D mainly accept traditional expectations. Type A is for security-seeking workers, who prefer a fixed work schedule, have moderate wage expectations and are less ambitious. Type D guarantees above-average loyalty and performance with higher pay demands, but still within a traditional framework. Types B and C, on the other hand, correspond to partially or fully flexible employment requiring new types of skills. Within this, type C represents all aspects of informal, flexible, creative and mobile work. Type B is somewhat closer to the traditional concept.

It may be somewhat surprising that less than a third of businesses put type B first and almost none highlighted type C, while nearly half of SMEs and more than two thirds of large businesses said they would support flexible working. This can be interpreted as firms basically perceiving changes in the labour market and supporting more flexible working accordingly, but when this could actually happen, their apparent commitment drops significantly. It is particularly striking that it is in large companies that this difference is most marked; despite being by far the most innovative and tolerant of change, they have the lowest enthusiasm for C-type workers (Table 10).

In summary, it was clear that large companies are significantly ahead in the innovation-digitalisation transformation, with continuous training enabling them to

respond more flexibly to changing challenges consistently with the last research hypothesis. It is important to see that two thirds of enterprises still prefer the fully traditional-bound type A workforce, but the demand for the other traditional, 'multi' type D workforce is the most rejected by Hungarian enterprises.

The need for a partially or fully flexible, creative workforce is quite low for all sizes of companies, but interestingly even small companies are the most open to employing this type of workforce.

The more positive attitude of small businesses towards flexible working is also reflected in the fact that around 12% of them ranked B and C workers in the top two. For large companies, this proportion is only 8%, while for medium-sized companies it is only 4%. When looking at the other types, one cannot see such a difference: 63% of small companies, 66% of medium-sized companies and 69% of large companies ranked the most conservative option A, first.

Table 6

Perception of innovation by enterprise size category

(%)

Changes in productivity					
company size/ number of employees	1. much worse	2. worse	3. about the same	4. better	5. much better	4+5. better/ much better
Small (10–49)	1.1	5.3	40.4	43.6	9.6	53.2
Medium (50–249)	0.0	3.7	30.3	48.6	17.4	66.1
Large (250<)	0.0	3.2	22.6	54.8	19.4	74.2
All (10–)	0.4	4.3	33.3	47.4	14.5	62.0

(%)

Your company is much more innovative than your competitors					
company size/ number of employees	1. not typical at all	2. not typical	3. medium typical	4. typical	5. fully typical	4+5. typical/ fully typical
Small (10–49)	1.0	10.1	37.4	29.3	22.2	51.5
Medium (50–249)	0.0	6.1	28.1	41.2	24.6	65.8
Large (250<)	0.0	9.4	21.9	37.5	31.3	68.8
All (10–)	0.4	8.2	31.0	35.9	24.5	60.4

(%)

In the last five years, your company has introduced a lot of innovations					
company size/ number of employees	1. not typical at all	2. not typical	3. medium typical	4. typical	5. fully typical	4+5. typical/ fully typical
Small (10–49)	2.7	13.4	25.9	25.9	20.5	11.6
Medium (50–249)	0.0	11.6	17.4	42.1	25.6	3.3
Large (250<)	0.0	5.9	20.6	32.4	35.3	5.9
All (10–)	1.1	11.6	21.3	34.1	24.7	7.1

(Tables continue on the next page.)

(Continued.)

(%)

Your company is constantly improving its business

company size/ number of employees	1. not typical at all	2. not typical	3. medium typical	4. typical	5. fully typical	4+5. typical/ fully typical
Small (10–49)	2.0	8.1	26.3	37.4	26.3	63.6
Medium (50–249)	0.0	6.8	22.2	39.3	31.6	70.9
Large (250<)	0.0	6.3	21.9	34.4	37.5	71.9
All (10–)	0.8	7.3	23.8	37.9	30.2	68.1

(%)

Your company provides the customers with innovative products and services

company size/ number of employees	1. not typical at all	2. not typical	3. medium typical	4. typical	5. fully typical	4+5. typical/ fully typical
Small (10–49)	0.9	4.7	24.5	42.5	27.4	69.8
Medium (50–249)	0.0	2.7	25.9	44.6	26.8	71.4
Large (250<)	0.0	6.3	25.0	37.5	31.3	68.8
All (10–)	0.4	4.0	25.2	42.8	27.6	70.4

(%)

Your company innovatively solves customer problems

company size/ number of employees	1. not typical at all	2. not typical	3. medium typical	4. typical	5. fully typical	4+5. typical/ fully typical
Small (10–49)	1.0	5.7	22.9	39.0	31.4	70.5
Medium (50–249)	0.0	3.5	24.8	42.5	29.2	71.7
Large (250<)	0.0	6.5	25.8	45.2	22.6	67.7
All (10–)	0.4	4.8	24.1	41.4	29.3	70.7

(%)

Your company innovatively serves the customer needs

company size/ number of employees	1. not typical at all	2. not typical	3. medium typical	4. typical	5. fully typical	4+5. typical/ fully typical
Small (10–49)	0.9	4.7	23.4	39.3	31.8	71.0
Medium (50–249)	0.0	2.7	23.0	41.6	32.7	74.3
Large (250<)	0.0	6.3	25.0	46.9	21.9	68.8
All (10–)	0.4	4.0	23.4	41.3	31.0	72.2

Table 7

Assessment of capacity for change by enterprise size category

(%)

Change is part of the organisational culture					
company size/ number of employees	1. not true at all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	14.2	27.4	29.2	22.1	7.1	29.2
Medium (50–249)	0.0	20.7	33.9	29.8	15.7	45.5
Large (250<)	0.0	14.3	28.6	45.7	11.4	57.1
All (10–)	5.9	22.7	31.2	28.6	11.5	40.1

(%)

Your organisation is prepared to constantly change the existing processes					
company size/ number of employees	1. not true at all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	17.7	22.1	28.3	21.2	10.6	31.9
Medium (50–249)	3.3	20.7	33.9	28.1	14.0	42.1
Large (250<)	2.9	14.3	22.9	42.9	17.1	60.0
All (10–)	9.3	20.4	30.1	27.1	13.0	40.1

(%)

Your company is constantly looking for ways to innovate					
company size/ number of employees	1. not true at all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	7.1	11.5	31.9	32.7	16.8	49.6
Medium (50–249)	1.7	6.6	33.1	34.7	24.0	58.7
Large (250<)	0.0	14.3	11.4	48.6	25.7	74.3
All (10–)	3.7	9.7	29.7	35.7	21.2	56.9

(%)

The capacity for change is more advanced than that of the competitors					
company size/ number of employees	1. not true at all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	10.1	20.2	38.5	21.1	10.1	31.2
Medium (50–249)	0.0	13.5	44.1	31.5	10.8	42.3
Large (250<)	0.0	12.1	24.2	42.4	21.2	63.6
All (10–)	4.3	16.2	39.1	28.5	11.9	40.3

Table 8

Perception of digitalisation by enterprise size category

(%)

	Management is committed to digital transformation					
company size/ number of employees	1. not true all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	12.1	18.7	28.6	28.6	12.1	40.7
Medium (50–249)	3.6	18.0	22.5	33.3	22.5	55.9
Large (250<)	9.7	9.7	16.1	32.3	32.3	64.5
All (10–)	7.7	17.2	24.0	31.3	19.7	51.1

(%)

	Management fully supports digital transformation					
company size/ number of employees	1. not true all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	12.1	14.3	33.0	29.7	11.0	40.7
Medium (50–249)	2.7	17.1	24.3	35.1	20.7	55.9
Large (250<)	6.5	12.9	12.9	38.7	29.0	67.7
All (10–)	6.9	15.5	26.2	33.5	18.0	51.5

(%)

	Management sees digital transformation as a strategic priority					
company size/ number of employees	1. not true all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	13.2	19.8	30.8	25.3	11.0	36.3
Medium (50–249)	3.6	14.4	32.4	34.2	15.3	49.5
Large (250<)	3.3	16.7	16.7	43.3	20.0	63.3
All (10–)	7.3	16.8	29.7	31.9	14.2	46.1

(%)

	Management communicates well the need for digital transformation to employees					
company size/ number of employees	1. not true all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	11.2	16.9	29.2	31.5	11.2	42.7
Medium (50–249)	2.7	14.4	31.5	33.3	18.0	51.4
Large (250<)	3.3	16.7	20.0	43.3	16.7	60.0
All (10–)	6.1	15.7	29.1	33.9	15.2	49.1

(Tables continue on the next page.)

(Continued.)

(%)

	Degree of digital transformation						
company size/ number of employees	1. no digital trans-formation	2. slight digital trans-formation	3. digital trans-formation below average	4. digital trans-formation above average	5. at the forefront of digital trans-formation	6. leading role in the digital trans-formation	4+5+6. above average/at the forefront /leading role
Small (10–49)	13.2	21.1	36.0	13.2	1.8	14.9	29.8
Medium (50–249)	4.2	16.8	41.2	27.7	3.4	6.7	37.8
Large (250<)	0.0	8.8	44.1	29.4	8.8	8.8	47.1
All (10–)	7.5	17.6	39.3	21.7	3.4	10.5	35.6

(%)

	They have the expertise to create new digital solutions				
company size/ number of employees	1. not true all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	11.3	18.6	25.8	34.0	10.3	44.3
Medium (50–249)	1.8	11.5	35.4	33.6	17.7	51.3
Large (250<)	0.0	6.3	18.8	43.8	31.3	75.0
All (10–)	5.4	13.6	29.3	35.1	16.5	51.7

Table 9

Assessment of the state of digitalisation skills by enterprise size category

(%)

	They are constantly developing their staff to be at the forefront of creating digital solutions				
company size/ number of employees	1. not true all	2. rather not true	3. partly true	4. more like true	5. fully true	4+5. more like true/ fully true
Small (10–49)	9.4	18.8	33.3	26.0	12.5	38.5
Medium (50–249)	1.8	16.8	34.5	28.3	18.6	46.9
Large (250<)	0.0	9.4	18.8	56.3	15.6	71.9
All (10–)	4.6	16.6	32.0	31.1	15.8	46.9

(%)

	Would you tolerate requests for flexible working in your company?		
company size/number of employees	1. supports the flexible working	2. partly supports the flexible working	3. does not support the flexible working
Small (10–49)	45.0	38.7	16.2
Medium (50–249)	46.2	39.5	14.3
Large (250<)	68.6	25.7	5.7
All (10–)	48.7	37.4	14.0

Table 10

Demand for labour types by enterprise size category

(%)

Do you personally consider it beneficial if the proposals and decisions of non-executive colleagues and experts can also have a significant impact on the operation of the organisation?

company size/number of employees	1. supports democratic decision-making	2. partly supports democratic decision-making	3. does not support democratic decision-making
Small (10–49)	21.4	53.6	25.0
Medium (50–249)	31.7	41.7	26.7
Large (250<)	40.0	45.7	14.3
All (10–)	28.5	47.2	24.3

(%)

Does your company offer the opportunity for a new employee to reach a senior position in 2–3 years?

company size/number of employees	1. the company offers fast career progression	2. the company partly offers fast career progression	3. the fast career progression is not typical in the company
Small (10–49)	20.4	69.0	10.6
Medium (50–249)	42.5	53.3	4.2
Large (250<)	40.0	60.0	0.0
All (10–)	32.8	60.8	6.3

(%)

Type B work (partly flexible working hours, demand for alternative career paths, individual and group work are eqully important, workers are able to adapt to constantly changing conditions)

company size/ number of employees	1. type B work is in the 1st place	2. type B work is in the 2nd place	3. type B work is in the 3rd place	4. type B work is in the 4th place	1+2. type B work is in the 1st or in the 2nd place
Small (10–49)	33.0	40.4	14.7	11.9	73.4
Medium (50–249)	28.6	36.1	22.7	12.6	64.7
Large (250<)	22.9	42.9	25.7	8.6	65.7
All (10–)	29.7	38.8	19.8	11.8	68.4

(%)

Type C work (creative working style, minimal link between career and position in the organisation, complete freedom to work independently, high level of language skills, international mobility)

company size/ number of employees	1. type C work is in the 1st place	2. type C work is in the 2nd place	3. type C work is in the 3rd place	4. type e C work is in the 4th place	1+2. type C work is in the 1st or in the 2nd place
Small (10–49)	1.9	26.2	48.6	23.4	28.0
Medium (50–249)	2.5	23.5	52.1	21.8	26.1
Large (250<)	2.9	31.4	45.7	20.0	34.3
All (10–)	2.3	25.7	49.8	22.2	28.0

(Tables continue on the next page.)

(Continued.)

Demand for B and C types of jobs: very low (only 12% of small businesses prefer them,
with most ranking 2nd and 3rd)

denomination	1. type C work is in the 1st place	2. type C work is in the 2nd place	3. type C work is in the 3rd place	4. type C work is in the 4th place	all small companies
Small companies (10–49)					
Type B work is in the 1st place	0.0	10.3	14.0	7.5	31.8
Type B work is in the 2nd place	1.9	0.0	29.0	10.3	41.1
Type B work is in the 3rd place	0.0	9.3	0.0	5.6	15.0
Type B work is in the 4th place	0.0	6.5	5.6	0.0	12.1
All small companies	1.9	26.2	48.6	23.4	100.0
Medium-sized companies (50–249)					
Type B work is in the 1st place	0.0	4.2	16.0	8.4	28.6
Type B work is in the 2nd place	0.0	0.0	29.4	6.7	36.1
Type B work is in the 3rd place	1.7	14.3	0.0	6.7	22.7
Type B work is in the 4th place	0.8	5.0	6.7	0.0	12.6
All medium-sized companies	2.5	23.5	52.1	21.8	100.0
Large companies (50–249)					
Type B work is in the 1st place	0.0	5.7	17.1	0.0	22.9
Type B work is in the 2nd place	2.9	0.0	25.7	14.3	42.9
Type B work is in the 3rd place	0.0	20.0	0.0	5.7	25.7
Type B work is in the 4th place	0.0	5.7	2.9	0.0	8.6
All large companies	2.9	31.4	45.7	20.0	100.0

(%)

Demand on type A work (fixed working hours, salary is closely linked to the position
in the hierarchy, individual responsibility prevails, the employee's qualifications and
professional knowledge are the most important)

company size/ number of employees	1. type A work is in the 1st place	2. type A work is in the 2nd place	3. type A work is in the 3rd place	4. type A work is in the 4th place
Small (10–49)	63.2	18.4	11.4	7.0
Medium (50–249)	65.8	25.8	5.0	3.3
Large (250<)	68.6	17.1	2.9	11.4

(%)

Demand on type D work (expected to be constantly available, well above average remuneration,
identification with company values, loyalty to the company, ability to work in a team)

company size/ number of employees	1. type D work is in the first place	2. type D work is in the 2nd place	3. type D work is in the 3rd place	4. type D work is in the 4th place
Small (10–49)	3.8	15.1	24.5	56.6
Medium (50–249)	3.4	14.3	20.2	62.2
Large (250<)	5.7	8.6	25.7	60.0

Conclusions

In this research, the employers' expectations and skill gap problem in Europe by region, and also in Hungary was analysed. Using around 20,000 observations from the Eurofound's European Company Survey, EU economies were clustered. The cluster analysis supported our hypotheses that there are characteristic groups of the European countries concerning the employers' expectations, and the catching up countries are separated from the developed ones. It was found that clusters were distinguished by the nature of jobs, i.e. by the importance of problem-solving skills, by the possibility of independent time management, and by the complexity of the work and the degree of autonomy. The main lesson of the cluster analysis is that developed countries, in particular the developed North European countries are not only in the leading positions on the area of innovation as shown by the European Innovation Scoreboard, but the differences appear also in the expectations of employers. The catching-up countries seem to have given up on being innovative, contenting themselves with adopting best practices, which is a cause for concern for the catching-up process.

In the three cases studied (small, medium-sized and all companies), the Hungarian economy significantly underperformed the average for developed economies on these dimensions, i.e. Hungarian jobs were found to be simpler and less flexible, with less need for autonomous problem solving and decision making. It can be seen that this state of affairs is not very conducive to creativity and reduces innovation and its absorptive capacity as it was formulated by one of our research hypotheses.

Hungarian employers were surveyed by size about the status of innovation, digitalisation, training systems within the firm and the firm's capacity for change, and with it the type of workforce they most need: traditional-bound, semi-flexible, fully flexible-creative or requiring a full workload with high pay, which is considered to be typical in multinational companies ('multi' type).

Overall, the Hungarian survey also confirmed that the Hungarian economy is still at the beginning of the digitalisation–innovation transformation, with simpler types of work and fixed forms of work still fitting the current production structure. Continuous training/retraining is less common, creativity and problem-solving skills are not expected in most jobs. This, in turn, could induce a further loss of innovation potential compared to the advanced economies of Northern and Western Europe. Overall, the characteristics of the workforce required by Hungarian businesses differs significantly from developed Western European patterns: the expected activities in the workplace are simpler and less flexible, requiring less independent problem-solving and decision-making skills, and therefore lifelong learning and new skills are not essential for these less creative jobs. Closing this gap would be essential to accelerate the catching-up process in Hungary: it would be very important to develop a higher value-added production structure, while at the same time training the labour

force for new types of skills. By doing so the future skill mismatch can be avoided between labour demand and supply, making the quick the catching-up process possible in Hungary.

The research suggests that the catching-up process could be effectively facilitated on the labour demand side by the creation of new types of jobs requiring ability of problem solving, employees' autonomy, continuous development of skills, and flexibility.

Acknowledgement

REFERENCES

ABBAS, J.–SAGSAN, M. (2020): Identification of key employability attributes and evaluation of university graduates' performance – Instrument development and validation *Higher Education, Skills and Work-Based Learning* 10 (3): 449–466. https://doi.org/10.1108/HESWBL-06-2019-0075

ARVANITIS, A.–TOULOUMAKOS, A. K.–DIMITROPOULOU, P.–VLEMINCX, E.–THEODORU, M.–PANAYIOTOU, G. (2022): Learning how to learn in a real-life context: Insights from expert focus groups on narrowing the soft-skills gap *European Journal of Psychology Open* 81 (3): 71–77. https://doi.org/10.1024/2673-8627/a000027

BARTÓK, B.–MITEV, A. (2018): Észlelt munkaadói értékajánlatok és a munkavállalók által tapasztalt valóság *Vezetéstudomány/Budapest Management Review* 49: 10–11. https://doi.org/10.14267/VEZTUD.2018.10.05

BELWAL, R.–PRIYADARSHI, P.–AL FAZARI, M. H. (2017): Graduate attributes and employability skills: Graduates' perspectives on employers' expectations in Oman *International Journal of Educational Management* 31 (6): 814–827. https://doi.org/10.1108/IJEM-05-2016-0122

BERTHON, P. R.–PITT, L. F.–PLANGGER, K.–SHAPIRO, D. (2012): Marketing meets Web 2.0, social media, and creative consumers: implications for international marketing strategy *Business Horizons* 55 (3): 261–271. https://doi.org/10.1016/j.bushor.2012.01.007

CAPELLI, P. H. (2015): Skill gaps, skill shortages, and skill mismatches: evidence and arguments for the United States *ILR Review* 68 (2): 251–290. https://doi.org/10.1177/0019793914564961

CINQUE, M. (2016): Lost in translation. Soft skills development in European countries *Tuning Journal for Higher Education* 3 (2): 389–427. https://doi.org/10.18543/tjhe-3(2)-2016pp389-427

FERRI-REED, J. (2014): Leading a multi-generational workforce: millennializing the workplace *The Journal for Quality and Participation* 37 (1): 13–14.

FODOR, M. (2015): Employer Branding: Milyen a jó munkáltató? In: *Vállalkozásfejlesztés a XXI. században* pp. 109–120., Óbudai Egyetem, Budapest.

HERRIOTT, P.–MANNING, W.–KIDD, J. M. (1997): The content of the psychological contract *British Journal of Management* 8 (2): 151–162. https://doi.org/10.1111/1467-8551.0047

JACKSON, D. (2016): Modelling graduate skill transfer from university to the workplace *Journal of Education and Work* 29 (2): 199–231. https://doi.org/10.1080/13639080.2014.907486

LAZÁNYI, K. (2014): An employer of my liking. In: MICHELBERGER, P. *MEB 2014: Management, Enterprise and Benchmarking in the 21st Century* pp. 211–220., Óbuda University, Keleti Faculty of Business and Management, Budapest.

LEE, J.-D.–BAEK, C.–YEON, J.-I. (2021): Middle innovation trap: capability transition failure and stalled economic growth. In: LEE, J.-D.–MEISSNER, D.–RADOSEVIC, S.–VONURTAS, N. (eds.): *The challenges of technology and economic catch-up in emerging economies* pp. 100–122., Oxford University Press, Oxford.

LEE, K. (2021): Economics of technological leapfrogging. In: LEE, J.-D.–MEISSNER, D.–RADOSEVIC, S.–VONURTAS, N. (eds.): *The challenges of technology and economic catch-up in emerging economies* pp. 123–159., Oxford University Press, Oxford.

LIEVENS, F.–VAN HOYE, G.–ANSEEL, F. (2007): Organizational identity and employer image: towards an unifying framework *British Journal of Management* 18 (s1): S45–S59. https://doi.org/10.1111/j.1467-8551.2007.00525.x

MATSOUKA, K.–MIHAIL, D. M. (2016): Graduates' employability: What do graduates and employers think? *Industry and Higher Education* 30 (5): 321–326. https://doi.org/10.1177/0950422216663719

MCCRACKEN, M.–CURRIE, D.–HARRISON, J. (2016): Understanding graduate recruitment, development and retention for the enhancement of talent management: sharpening 'the edge' of graduate talent *The International Journal of Human Resource* 27 (22): 2727–2752. https://doi.org/10.1080/09585192.2015.1102159

MCGUNAGLE, D.–ZIZKA, L. (2020): Employability skills for 21st century STEM students: the employers' perspective *Higher Education, Skills and Work-Based Learning* 10 (3): 591–606. https://doi.org/10.1108/HESWBL-10-2019-0148

MCMURRAY, S.–DUTTON, M.–MCQUAID, R.–RICHARD, A. (2016): Employer demands from business graduates *Education + Training* 58 (1): 112–132. https://doi.org/10.1108/ET-02-2014-0017

MOORE, T.–MORTON, J. (2017): The myth of job readiness? Written communication, employability, and the 'skills gap' in higher education *Studies in Higher Education* 42 (3): 591–609. https://doi.org/10.1080/03075079.2015.1067602

NELSON, M.–BRAEKKAN, K. (2017): A Generational Change: An Empirical Exploration of the Gen Y's Workplace Expectations *Athens Journal of Business and Economics* 3 (2): 123–142. https://doi.org/10.30958/ajbe.3.2.3

NGUYEN, H.–JAMARILLO, P. A. (2014): Institutions and firms' return to innovation – evidence from the World Bank enterprise survey *World Bank Policy Research Working Paper.* 6918. Washington.

OVIAWE, J.I.–UWAMEIYE, R.–UDDIN, P. S. O. (2017): Bridging skill gap to meet technical, vocational education and training school-workplace collaboration in the 21st century *International Journal of Vocational Education and Training Research* 3 (1): 7–14. https://doi.org/10.11648/j.ijvetr.20170301.12

PANG, E.–WONG, M.–LEUNG, C. H.–COOMBES, J. (2019): Competencies for fresh graduates'
success at work: perspectives of employers *Industry and Higher Education* 33 (1): 55–65.
https://doi.org/10.1177/0950422218792333

ROBINSON, S. L.–MORRISON, E. W. (1995): Psychological contracts and OCB: The effect of
unfulfilled obligations on civic virtue behaviour *Journal of Organizational Behavior*
16 (3): 289–298. https://doi.org/10.1002/job.4030160309

ROUSSEAU, D. M.–TIJORIWALA, S. A. (1999): What makes a good reason to change? Motivated
reasoning and social accounts in organizational change *Journal of Applied Psychology*
84 (4): 514–528. http://dx.doi.org/10.1037/0021-9010.84.4.514

SARKAR, M.–OVERTON, T.–THOMPSON, C.–RAYNER, G. (2016): Graduate employability:
views of recent science graduates and employers *International Journal of Innovation in
Science and Mathematics Education* 24 (3): 31–48.

SCHWIEGER, D.–LADWIG, C. (2018): Reaching and retaining the next generation: adapting to
the expectations of Gen Z in the classroom *Information Systems Education Journal*
16 (3): 45–54.

STANISLAWSKI, R.–SZYMANSKI, G.–FIKHTNER, O. (2019): Open innovation and the
propensity to innovate among SME in Poland. In: TRIFONOV, V. A. (ed.):
Contemporary Issues of Economic Development of Russia: Challenges and Opportunities vol
59. pp. 17–24., European Proceedings of Social and Behavioural Sciences Future
Academy. https://doi.org/10.15405/epsbs.2019.04.3

STEVENS, M.–NORMAN, R. (2016): Industry expectations of soft skills in IT graduates – A
regional survey *Proceedings of the Australasian Computer Science Week Multiconference*
February 2016 Article No. 13: 1–9. https://doi.org/10.1145/2843043.2843068

SUCCI, C.–CANOVI, M. (2020): Soft skills to enhance graduate employability: comparing
students and employers' perceptions *Studies in Higher Education* 45 (9): 1834–1847.
https://doi.org/10.1080/03075079.2019.1585420

SULLIVAN, J. (2004): Eight elements of a successful employer brand *ER Daily* 23 (2): 501–517.

TÖRŐCSIK, M. (2003): *Fogyasztói magatartás – Trendek* KJK-KERSZÖV Jogi és Üzleti Kiadó
Kft., Budapest.

TURNLEY, W. H.–FELDMAN, D. C. (2000): Re-examining the effects of psychological contract
violations: unmet expectations and job dissatisfaction as mediators *Journal of
Organizational Behavior* 21 (1): 25–42.
https://doi.org/10.1002/(SICI)1099-1379(200002)21:1<25::AID-
JOB2>3.0.CO;2-Z

INTERNET SOURCES

[1] EUROPEAN COMMISSION (2023): *European Innovation Scoreboard, 2023*.
https://op.europa.eu/en/publication-detail/-/publication/04797497-25de-11ee-
a2d3-01aa75ed71a1 (downloaded: February 2024)

[2] EUROFOUND (2019): *European Company Survey [ECS]*.
https://www.eurofound.europa.eu/hu/data-catalogue/european-company-
survey?period=2019 (downloaded: February 2024)