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ARTIFICIAL INTELLIGENCE TOOLS IN HRM

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Abstract:

The article focuses on the use of artificial intelligence tools in HR activities. HRM (personnel management) is currently considered a strategic area of business management. However, the ability of companies to effectively attract and retain employees has become increasingly difficult in recent years given the state of the labour markets. Businesses are therefore looking for new ways (tools) to make the setup of HR activities more efficient. One option is to use digital economy tools, including artificial intelligence. However, an important prerequisite for using these new tools is an adequate level of digital skills among employees. The article is therefore focused on two objectives, which are very closely related: a) to map the current situation in the use of AI tools in HR activities; b) to find out how the corporate training focuses on developing employees' ICT skills.

Keywords: *Artificial intelligence, human resource management, digital literacy.*

JEL: J24, M5, M12

1 Introduction

The term human resource management (HRM) is usually used in two basic senses: a) It refers to the current stage in the development of HRM, i.e., a particular conceptual approach to managing and leading people in an enterprise. b) It refers to a specific area of enterprise management associated with managing and leading people (see, e.g., Armstrong, Taylor, 2023; Němec et al., 2014).

Armstrong (2007) defines human resource management as a strategically and logically thought-out approach to managing the most valuable resource organizations have – the people who work in the organization and who individually and collectively contribute to the achievement of the organization's goals.

Today, human resource management is one of the strategic management areas of every company (every organization). The structure of employees in terms of their number and required competencies has a direct impact on the performance of the organisation and its competitiveness and should therefore correspond to the company's objectives in the short, medium and strategic horizons.

In response to changes in the external environment (especially the effects of globalization and the development of ICT), to order to maximize the efficiency of HR activities, several new trends can be traced in HRM since approximately the mid-1990s (e.g. Armstrong, Taylor, 2023; Torrington et al., 2020):

a) HR departments are gradually changing their structure. Changes in the organisational structure of the HR departments have led to their substantial downsizing, with many HR activities being outsourced.

b) The content of personnel activities is expanded. HR professionals are forced to react to changes in the external environment (especially demographic, globalisation, or the labour market situation). The traditional HR activities are joined by others, such as HR management in multicultural environments, age management or diversity management.

c) The content of HR work is shifting from HR administration to HR activities of a strategic nature. Emphasis is placed on employee training and development, working with talent, employer branding, etc.; the concept of HR business partnerships is being developed (see e.g. Ulrich 1996, 2017).

d) There is close cooperation between HR managers and managers at all levels, especially line managers, who are now carrying out activities that were previously the sole responsibility of HR managers. They deal with the day-to-day management and leadership of the staff. They are involved in recruiting

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and selecting employees, assisting in the adaptation of new employees, participating in performance management and employee appraisals, employee training, designing variable pay, etc. They are in daily contact with their employees, they know them well (their needs and therefore their motivational profile) and can therefore perform many HR activities more efficiently than HR managers.

The period from the first contact of a potential employee with the company, his hiring, the performance of the required work to the eventual termination of the employment relationship is referred to as the employee life cycle (Scheme 1).

Scheme 1: Employee life cycle

Source: own processing

Basic HR activities include (e.g. Němec et al., 2014; Koubek, 2015; Armstrong, Taylor, 2023; Torrington, 2020) creating HR strategy and human resource planning, creating job tasks and jobs, recruiting and selecting employees, hiring and adaptation, performance management and employee appraisal, rewarding employees, training and development, care of employees, and redundancies.

The role of HR professionals has changed significantly in recent years. They are increasingly involved in the strategic affairs of the company. But the staff is also changing. On the one hand, they expect more from the organisation (interesting pay, flexibility of work, a wide range of employee benefits, the possibility of career growth, interesting work, etc.). On the other hand, higher demands are placed on them - high professional knowledge in a specific field and knowledge with overlap to related areas, soft skills (especially the ability to work in a team, communicate, share information), the ability to work with ICT, the ability to adapt quickly to frequent changes, the willingness to continuously learn). As Pandey et al. (2023) point out, recent technologies such as machine learning, blockchain, ChatGPT, the Internet of Things (IoT), and artificial intelligence (AI) play a significant role in this work dynamic.

There is no single definition of AI. The OECD (2019) defines AI as a system based on mechanical functioning that produces predictions, recommendations or decisions that affect real or virtual environments based on human-specified goals. An AI system is designed to operate with varying levels of autonomy. In addition, artificial intelligence performs human cognitive (learning) functions through a machine.

The European Commission's High Level Expert Group on Artificial Intelligence (AI HLEG) defines AI quite broadly. Systems that exhibit intelligent behaviour by analysing the environment and deciding on next steps – with a degree of autonomy – to achieve specific goals are referred to as AI. AI-based systems can be pure software, operating in a virtual world (e.g. voice assistants, turnaround analysis software, search engines, speech and facial recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or IoT applications) (AI HLEG, 2018).

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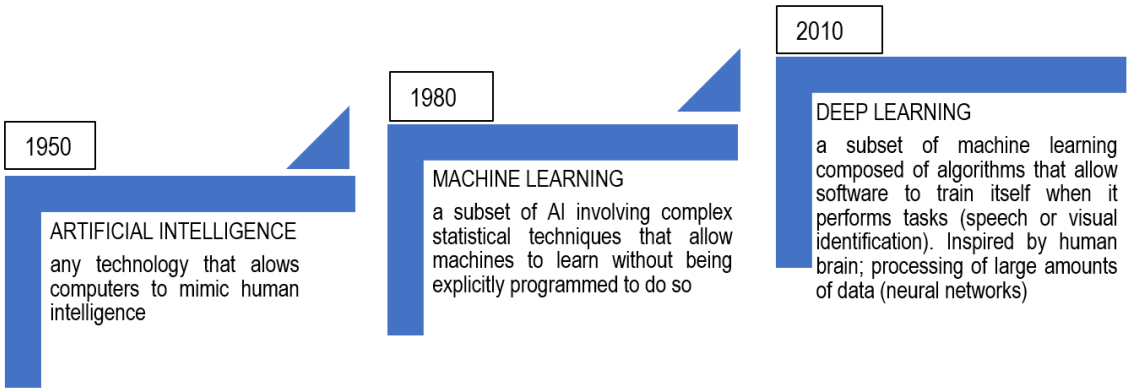
Scheme 2: Artificial intelligence development



Source: IDIA Working Group on Artificial Intelligence & Development (2019), modified

Artificial intelligence can also be defined as the ability of machines to simulate human abilities such as reasoning, learning, planning or creativity. Artificial intelligence enables technical systems to respond to environmental stimuli, solve problems or achieve certain goals. *"AI systems have the ability to operate autonomously and change and adapt their actions based on evaluating the effects of previous actions."* (EP, 2020).

In May 2024, a proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence and amending certain legislative acts of the Union (Artificial Intelligence Act) was approved (EC, 2021). This first AI regulatory framework will come into force in 2026. The main objective of this legislation is to ensure the safety of AI systems to be placed on the EU market. It should be explicitly prohibited to place on the market or put into service systems that manifestly endanger the life, health, safety or rights of persons and create an unacceptable risk (for more details see also EC, 2020).

In the context of the researched issue, it is necessary to draw attention to the fact that the Act on Artificial Intelligence classifies AI systems used in the field of human resources, especially in recruitment and selection of employees, in work performance management (i.e. in assigning tasks and evaluating employees), in decision-making on career growth and promotion, or, on the contrary, dismissal, as high-risk. AI systems make decisions based on information from assessing an individual's behaviour, personality traits, characteristics, behavioural monitoring, assessments, etc., and can thus have a significant impact on employees' working lives and careers. Within these HR processes, AI systems may fix historical patterns of discrimination, e.g. against women, certain age groups, persons with disabilities, persons of a certain racial or ethnic origin or sexual orientation (for more details see also Tolan et al., 2019; Buolamwini and Gebru, 2018). They can thus have negative impacts on fundamental human rights.

The problem at present is that preliminary impact assessments focus mainly on the technical aspect. They rarely address potential impacts on fundamental rights, as there is not yet information on how AI specifically affects the realisation of rights (EC, 2021).

In addition to the riskiness of some AI systems, another issue highlighted in relation to the use of AI (and the overall digital transformation of the economy) is the lack of digital competencies. This is already pointed out in the White Paper on Artificial Intelligence (EC, 2020). See also the Digital Education Action Plan 2021-2027 (EC, 2020a) and ICT for work: digital skills in the workplace (EC, 2016). The rapid proliferation of AI tools in HRM places higher demands on the level of digital skills of employees. Therefore, there is often a need for further employee training.

The first objective of this article is to map in which HR activities AI tools are most used. The second objective is to find out how companies are focusing on the ICT education.

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2 Methodology

To achieve the first objective, a literature search was used. Relevant resources were searched using the keywords: HRM, artificial intelligence, digital literacy. The e-resources used were EBSCO, ProQuest Central, EconLit, JSTOR, Scopus, Web of Sicence and EUR-Lex: EU Law.

Basic HR activities have been selected in line with the employee life cycle. As stated by Němec et al. (2014), basic HR activities (processes) include personnel planning, job creation and analysis, recruitment and selection, hiring and adaptation, performance management and appraisal, compensation, training and development, employee care and release. Šikýř (2016) adds the use of a personnel information system. See also e.g. Torrington et al. (2020); Beardwell, Thomson (2017).

As a result of the information gathered, a table was created that compares traditional and digital approaches to the implementation of HR activities.

The second objective was to find out how companies are focusing on training employees in ICT, to increase their digital skills. According to Armstrong (2007), training is a continuous process that not only enhances existing skills but also leads to the development of skills and knowledge, thus preparing employees for more challenging tasks. Biech (2022) states that education is a process designed to help an individual acquire new knowledge and skills. Companies often use the concept of systematic learning (see e.g. Armstrong, Taylor, 2023; Šikýř, 2016 for more details) as part of performance management. The aim is to identify the training need as quickly as possible (i.e. the gap between what knowledge and skills the employee has and what knowledge and skills the job currently requires) and to close this gap through an appropriate training programme (Dvořáková et al., 2012).

In the context of the second objective, an analysis of secondary data from the Eurostat Database was used, specifically the indicator Enterprises that provided training to develop ICT skills of their personnel.

3 Results

The use of artificial intelligence can be found in almost all HR activities, i.e. throughout the whole employee lifecycle – from job description, recruitment, and selection, through adaptation, training, performance management, appraisal to remuneration and career (see e.g. Eubanks, 2022; Ernst & Young, 2018).

Changes in HR are part of the overall digital transformation of the economy. As stated by Zhang and Chen (2023), artificial intelligence, cloud technology, big data and other advanced technologies are key to the dynamics of work. They enable rapid adaptation to the changes brought about by the digital era (da Silva et al., 2022). According to Sotnikova et al. (2018), the use of digital technologies leads to significant improvements in the efficiency of HR processes. Digital tools in HRM enable the provision of quality services to employees, help to reduce costs, increase labour productivity and thus contribute to greater employee satisfaction and engagement (da Silva et al., 2022).

3.1 Artificial intelligence in HR activities

Recruitment and selection of employees

The recruitment and selection of employees is directly linked to the planning and creation of jobs. For the entire recruitment process, an application tracking system (ATS) is often used, i.e. an information system that automates the entire process, from approaching the candidate to onboarding. Research has shown that ATSs reduce employee turnover while increasing the satisfaction of employees who work with these systems daily (Maier et al., 2013).

In recruitment, AI enables rapid analysis of CVs against predefined criteria that match the requirements of the job. Using algorithms to screen resumes has several advantages. Especially it brings recruiters a great saving of time and simultaneously minimizes human error or prejudice, because

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the systems evaluate candidates objectively, without emotions, according to defined (specified) parameters.

Artificial intelligence also enables detailed analysis of candidate profiles. It can thus estimate their characteristics that are not directly apparent from the CV. These are mainly soft skills and abilities of the candidates (e.g. ability to communicate, work in a team, adaptability) and personality characteristics. This makes it easier for recruiters to find candidates who best fit the company culture. In the case of teamwork, it is very important that the team is well assembled not only in terms of the expertise of the individual members, but also that the individuals complement each other in terms of personality characteristics so that they can fulfil their respective roles in the team (see Belbin, 2022 for more on this issue). The analysis of candidate profiles thus enables us to identify candidates who have the potential for long-term employment in the company.

AI chatbots and virtual assistants now routinely communicate with candidates during the recruitment process. They enable candidates to have all the information they need, answer common questions, and schedule appointments for interviews. They contribute to a better candidate experience, i.e. a better experience of the sourcing and selection process. Candidates who feel comfortable during the recruitment and selection process form positive relationships with the company. Surveys have shown that 56% of candidates who were not hired but had a positive experience of the recruitment process consider working for the company in the future; 37% recommend the company to their friends (CareerBuldier, 2017). Candidate experience is therefore an effective employer branding tool. AI chatbots can also conduct first round interviews and pre-select candidates. This allows recruiters to focus more on candidates with better qualifications for the job and higher potential.

According to Pilcher (2023), the advantages of ATS include in particularly the speed of the entire recruitment process, data centralization and reporting (data on all candidates in one place), facilitation of onboarding and compliance with GDPR.

Adaptation of employees to a suitable job

The adaptation process is crucial in terms of stabilising employees. As stated by Sotnikova et al. (2018), the use of AI allows the process of new employee onboarding to be fully automated. Chatbots can offer answers to common questions, facilitate familiarization with company documents, and overall facilitate better integration of the newcomer into the organization.

Employee training is an important tool for adaptation. Today, many enterprises are already using adaptive training programs using AI, augmented or virtual reality, or training programs with gaming elements (gamification). These tools provide an interesting and interactive way to introduce new employees to important information about the company or the job or to acquire the necessary knowledge and specific skills. It is important that new employees are placed in a position where they will be able to make the most of their knowledge and skills, i.e. their strengths, and develop further. Data analysis and AI allow to more personalise job offers and place employees in positions that better match their specific needs and preferences. This way can be a good tool to increase the interest of talented individuals and to stabilize them in the enterprise (for more details see e.g. Herger, 2014; Murawski, 2020).

Performance management and employee evaluation

In the area of performance management, new technologies (data platforms) make it possible to create a personal account for each employee, where information about their work behaviour, performance evaluation and competencies are recorded. In this way, organizations can more effectively assess employee performance, identify employee development needs, and even predict future employee competency needs (Zhang a Chen, 2023).

AI systems make it possible to analyse performance, proactively looking for reserves and weak points in individual departments of enterprises. They provide employees with real-time feedback on their performance; they can react immediately and improve their work skills based on concrete data. AI tools

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enable objective evaluation of employee performance according to defined criteria. Based on historical data on employee performance and skills, AI can recommend different career path options and offer specific steps an individual should take to achieve their career goals (Pandey et al. 2023; Eubanks, 2022).

Employee training and development

A strategic area of HR today is employee training and development. This area of HRM is also undergoing a significant digital transformation. In particular, e-learning and adaptive learning programs that incorporate AI are being used. These new technologies allow the individualization of training programs according to the needs of employees and create an environment that promotes creativity and high learning effectiveness (see also Eubanks, 2022; Pandey, 2023). Cloud storage allows high flexibility for employees to access learning programmes and materials; training can be delivered via online platforms. Technology makes it possible to offer a wide portfolio of training activities and at the same time monitor the progress of individual employees' learning (Sotnikova et al., 2020).

Employee development is a key area, especially working with talent (talent management). AI tools are already capable of effectively sourcing, managing and stabilise talents (Rožman et al., 2022). They enable individual employee career planning and better talent lifecycle management. This allows enterprises to maximise the potential of their human resources (workforce). For more on the issue of integrating AI into the talent management process, see Rožman et al. (2022). Some AI tools enable the analysis of trends in labour markets; the information obtained can then be used to forecast HRM processes, including talent management, more accurately.

Decision support and other uses of AI

Artificial intelligence provides HR professionals, at all levels of management, with the tools to make better decisions based on predictive analysis. The huge amount of data collected allows not only to monitor the performance of employees, but also their satisfaction (e.g. with the motivation system, the possibility of career growth, remuneration, etc.). AI tools make it possible to identify leadership talent (leaders) that are important to the enterprise (Eubanks, 2022). On the other hand, they are also able to identify dissatisfied employees who are at risk of unwanted turnover. This gives HR a chance to discuss with such employees in a timely manner, or to help them resolve their problem and prevent them from unwantedly leaving the enterprise.

AI tools also allow to promote diversity in the workplace. Experience shows that more diverse staff and highly diversified teams are more effective and are better to solve complex problems better and faster. Recruiters may also unintentionally tend to select certain types of candidates. AI can better ensure a diverse workforce. AI tools select suitable candidates based on set criteria, without emotion or bias (Sotnikova et al., 2020).

Finally, AI tools can manage payroll and take over HR administration. This gives HR professionals the space to strategically manage HR activities (da Silva et al., 2022).

It can be concluded that AI tools contribute to increasing the efficiency of HR activities, but also to building the employer reputation and employer brand.

Table 1: HR activities – traditional and digital approach

Personnel activity	Traditional practice	Use of new technologies, including AI
Planning and job creation	Analysis of the external environment using common analytical procedures Forecasting the need for personnel	Forecasting using digital tools Estimating future trends in labour markets
Recruitment of employees	Addressing candidates using methods without the use of modern technology (leaflets, advertisements), later e-recruitment, company website	Creating a tailored job advertisement concept e-recruitment – reaching a high number of candidates via social networks, redirection to the company's website Chatbots – communication with candidates, pre-selection

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Selection of employees	CV scanning mechanically (by recruiters) Selection methods (interviews, AC, professional and personality tests)	Using algorithms for CV screening (CV machine analysis) Candidate profile analysis and estimation of personality characteristics Selection of candidates with the required soft skills, personality characteristics and in relation to the corporate culture
Adaptation of employees (onboarding)	Classic adaptation process – assignment of a mentor, induction, on-the-job training, mutual feedback (newcomer – supervisor)	Full automation of the adaptation process Chatbot - communication with the employee throughout the process Adaptive training programs using VR and gamification Designing a set of training activities (skill set) for the new job
Performance management and employee evaluation	Assignment of work task, determination of KPIs and evaluation methods (evaluation questionnaire, evaluation scale, observation); risk of subjectivity of evaluation	Data platforms – employee's individual account, collection of data on performance, evaluation and competencies, identification of knowledge gaps Objective performance evaluation according to defined criteria
Employee training and development	Identification of training needs (according to the job specification or using the competency model), training planning, selection of methods, implementation of training, evaluation of its effectiveness (impact on KPIs) Talent selection – based on performance evaluation, using the development centre	Cloud storage - high flexibility of access to study programmes and materials Determining training needs and designing appropriate training programs Individualisation of educational programmes combined with monitoring of educational progress Use of e-learning (high flexibility) Online platforms More effective talent recruitment and management and the establishment of individual career plans
HR administration	Setting up an employee's personal card (paper form) Payroll accounting	employee e-cards Cloud storage – storage of necessary information about the employee, permanent updates (information in one place – accessible for employees who work with the data) Full automation of payroll accounting

Source: own processing

But neglecting human interaction and too much automation can create a barrier between HR and employees (Maier et al., 2013). The overuse of AI can lead to a loss of the ability to take into consideration the human context and make decisions in a context that AI does not have. Therefore, the integration of AI into HR processes should be implemented gradually and deliberately.

3.2 ICT training of employees

Kulkarni (2022) point to the importance of training, especially in recent years, when the pace of innovation is increasing, placing higher demands on employees. According to Mamatelashvili (2020), only those companies that systematically devote themselves to employee training are leaders in technological innovation. New AI tools can only be used effectively if employees have the appropriate skills.

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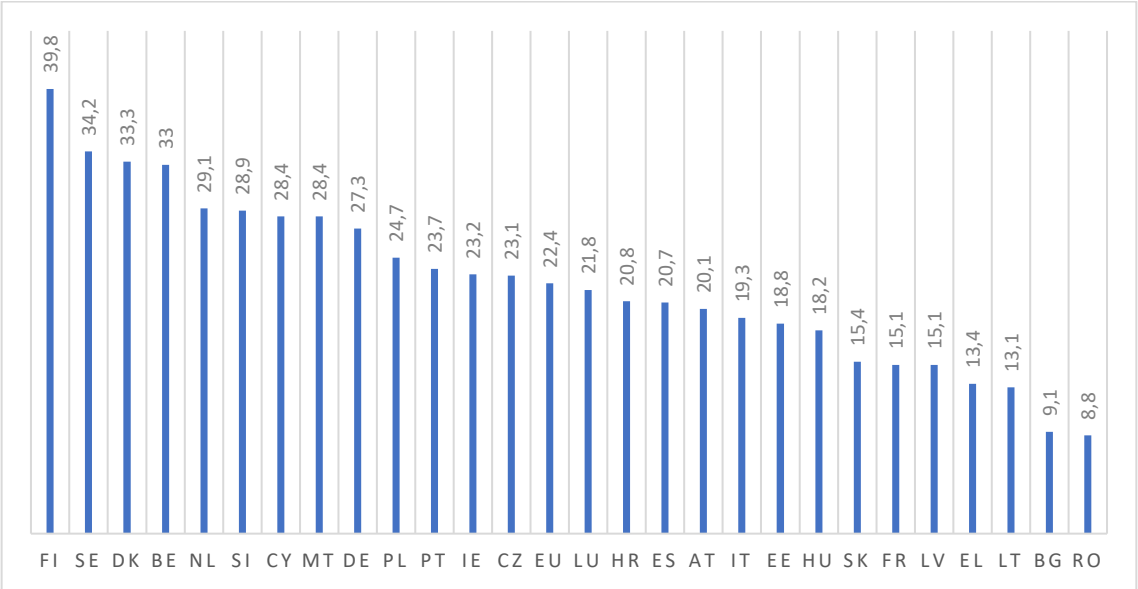
Graph 1: Enterprises (10 person employed or more) that provided training to develop/upgrade ICT skills of their personnel (EU, 2022, %)



Source: Eurostat Database (2024-05-30), own processing

Notes: FI – Finland, SE – Sweden, DK – Denmark, BE – Belgium, NL – Netherlands, SI – Slovenia, CY – Cyprus, MT – Malta, DE – Germany, PL – Poland, PT – Portugal, IE – Ireland, CZ – Czechia, EU – European Union, LU – Luxembourg, HR – Croatia, ES – Spain, AT – Austria, IT – Italy, EE – Estonia, HU – Hungary, SK – Slovakia, FR – France, LV – Latvia, EL – Greece, LT – Lithuania, BG – Bulgaria, RO – Romania.

Data show that in 2022 (more recent data not yet available), 23.1% of enterprises in the Czech Republic (enterprises with 10 or more employees) provided ICT skills training to their employees. This is more than the EU average (22.4%). However, the results differ according to the size of enterprises: in the case of SMEs (enterprises with up to 249 employees), 20.8% of enterprises in the Czech Republic (20.9% in the EU) provided ICT training to their employees, while in large enterprises (over 250 employees) 79.9% of enterprises in the Czech Republic (69.5% in the EU) did so. Regardless of the size of the enterprise (enterprises with 10 or more employees), more enterprises in the Czech Republic than in the EU provided ICT training each year in the period 2012-2022, on average 23.1% (EU 20.9%).

Table 2. Enterprises (10 person employed or more) that provided training to develop/upgrade ICT skills of their personnel (EU27, %) – comparison between 2012 and 2022

Country	2012	2022	Change	Country	2012	2022	Change
Poland	10.3	24.7	+14.4	Slovenia	27.1	28.9	+1.8
Netherlands	16.4	29.1	+12.7	Czechia	21.9	23.1	+1.2
Sweden	23.1	34.2	+11.1	Luxembourg	20.6	21.8	+1.2
Italy	10.8	19.3	+8.5	Portugal	22.6	23.7	+1.1
Estonia	12.1	18.8	+6.7	Cyprus	28.1	28.4	+0.3
Denmark	27.5	33.3	+5.8	Finland	39.9	39.8	-0.1
Latvia	9.8	15.1	+5.3	Germany	27.5	27.3	-0.2
Spain	15.6	20.7	+5.1	Greece	14.7	13.4	-1.3
Malta	23.9	28.4	+4.5	Ireland	27.6	23.2	-4.4
Hungary	13.9	18.2	+4.3	Bulgaria	13.5	9.1	-4.4

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EU27	18.1	22.4	+4.3	France	19.7	15.1	-4.6
Romania	4.8	8.8	+4.0	Croatia	28.1	20.8	-7.3
Lithuania	10.0	13.1	+3.1	Austria	29.3	20.1	-9.2
Belgium	30.2	33.0	+2.8	Slovakia	24.7	15.4	-9.3

Source: Eurostat Database (2024-06-01), own processing

The data shows that during the period under review (2012-2022) there has been an increase in the number of enterprises providing ICT skills training to their employees. In the EU, the number of such enterprises increased by 4.3 p.p. (percentage points), in the Czech Republic by 1.2 p.p. Looking at individual countries, however, the situation is not so clear. In 18 EU countries, the number of companies that train their employees in ICT has increased (most in Poland, by 14.4 pp). In 9 EU countries, the trend was reversed, with the largest declines in Slovakia (by 9.3 pp) and Austria (by 9.2 pp). The reasons for the decline may be different. Available data show that the decline occurred in some countries in 2020, due to the adverse economic situation caused by the pandemic. However, this is only one cause; it depends on the specific economic situation in individual countries.

4 Discussion and conclusion

HRM is changing significantly because of digital transformation. Today, ICT, including artificial intelligence tools, are already used in all major HR activities. Personnel activities are thus faster, more accurate and not burdened by subjectivity. Meanwhile, AI takes over mainly routine work and HR managers can focus much more on strategic activities. The use of new technologies is a way to make businesses more competitive. According to da Silva et al. (2022), firms need to adapt quickly to the changes brought about by the digital era.

However, the use of artificial intelligence tools in HRM also brings certain difficulties. These include the GDPR, the risk of discrimination and the lack of digital skills (EC, 2020). Analysis has shown that more and more companies across the EU are training their employees in ICT skills. The external corporate environment is changing rapidly, and employees are expected to be highly adaptable to new conditions, flexible and willing to continuously learn. Corporate training is an effective tool to bridge the gap between what an employee knows (what skills, abilities and knowledge) and what they need to be able to do in their job. Currently, it is also the ability to work with advanced AI tools.

5 Resources

Secondary resources

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