
Reskilling and Upskilling in Business Practice: An Analysis of Needs, Barriers, and Directions for Competency Development from the Perspective of Employers

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Abstract:

Purpose: To identify reskilling and upskilling practices in enterprises, diagnose current competency needs, identify barriers to development programs, and determine the directions of future competency development from the employers' perspective.

Design/Methodology/Approach: A mixed-methods research design was used, combining a quantitative survey among 383 employers from the Podkarpackie Voivodeship (using CATI/CAWI techniques and non-parametric statistical tests) with qualitative individual in-depth interviews (IDI) subjected to thematic analysis.

Findings: Significant competency gaps were identified across all analyzed skill groups, with the largest deficiencies found in digital, analytical, and green competencies. The dominant workforce development model remains reactive, heavily relying on traditional internal training. Furthermore, four key directions for competency development were identified: technological-adaptive, specialist, pro-environmental, and hybrid.

Practical Implications: The results demonstrate a critical need for a strategic shift from reactive training to long-term competency development. Organizations should place greater emphasis on practical methods such as mentoring and learning-by-doing, while regional stakeholders need to improve the availability of specialized training programs within the region.

Originality/Value: The study offers an empirical, multi-dimensional analysis of reskilling and upskilling within a regional ecosystem characterized by smart specializations (aviation, automotive, and IT). It uniquely reveals a structural tension between employers' high awareness of competency needs and their limited organizational capacity to implement systemic, forward-looking development strategies.

Keywords: Reskilling, upskilling, competence gap, employers, the Podkarpackie Voivodeship, digital transformation.

JEL codes: J24, M53, O15, R11.

Paper type: Research article.

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1. Introduction

Modern enterprises must adapt employee competencies to the new demands of the labor market, driven by dynamic technological changes, the development of artificial intelligence, process automation, and digital transformation. In this context, reskilling and upskilling processes are particularly important as they constitute the foundation of modern human resources management.

The literature emphasizes that both upskilling and reskilling are crucial to adapt employees to the fourth industrial revolution (Industry 4.0) and maintain employment in the era of automation. Organizations, in turn, increasingly view competency development as a strategic investment that determines a company's competitiveness and innovation.

According to a 2025 World Economic Forum report, as many as 39% of current employee competencies will require updating by 2030, necessitating intensified training and development efforts. This phenomenon stems primarily from ongoing digitization, the implementation of artificial intelligence-based tools, and organizational changes related to business model transformation.

The aim of this paper is to identify and evaluate reskilling and upskilling in business practice, identify key competency needs, barriers to implementing development programs, and indicate the main directions for developing future competencies. This purpose was achieved through quantitative research, supplemented with a qualitative component.

The quantitative research was conducted among employer representatives from the Podkarpackie Voivodeship, representing manufacturing, service, and retail companies. The respondents included owners, board members, and executives with knowledge of HR needs, training activities, and competency development within the organization.

Data was collected using CATI and CAWI techniques. The qualitative research was conducted using individual in-depth interviews, conducted based on a previously developed research scenario.

2. Literature Review

The concepts of reskilling and upskilling are related to adapting employee competencies to changing requirements. Their origins date back to the industrial revolution (Gruenewald and Mueller, 2025).

Reskilling is most often defined as the process of retraining an employee by acquiring new competencies that enable them to pursue a different profession or assume a new position (Gratton, 2020; Sawant *et al.*, 2022; World Economic Forum, 2025). According to a report by the World Economic Forum (2025), many current professions will disappear, and employees will be forced to transition to new roles, and reskilling is a key mechanism enabling this transition.

Upskilling, on the other hand, involves developing and deepening existing skills within a current professional role (Sawant *et al.*, 2022; World Economic Forum, 2025). Bhoomika and Lavanya (2025) define upskilling as the process of development of an individual's existing skill set to enhance expertise and adapt to new tools or processes in their current job.

The Organisation for Economic Co-operation and Development (OECD) defines upskilling as the process of developing and deepening employees' existing competencies to enable them to perform current tasks more effectively, or adapt to changing job requirements. The goal of upskilling is to increase employee efficiency and innovation by improving their knowledge, skills, and attitudes in the context of technological advancements, organizational change, or digital transformation (OECD, 2019).

Activities in this area are developmental, not adaptive, and support employees in maintaining their current professional position in a dynamic work environment. Reskilling, according to the OECD, refers to the process of employees acquiring new competencies that enable them to perform tasks in a different role or position, often within the same organization. This process is a response to structural changes in the labor market, process automation, technological development and the evolution of business models (OECD, 2019).

The consensus among various authors in defining the concepts analyzed boils down to the assumption that reskilling means acquiring entirely new skill sets, while upskilling refers to the improvement of existing competencies. Although the two processes differ in scope and purpose, reskilling and upskilling are complementary: the former fosters professional mobility between sectors, while the latter strengthens an individual's ability to achieve high performance in their current role and adapt to gradual changes (Kosasih, 2025).

In business practice, both processes complement each other. Reskilling is often used in situations of job automation or company reorganization, while upskilling enables

increased employee efficiency and productivity without requiring a change in their career path. The growing importance of these activities stems from the competency mismatch observed in the labor market. Many organizations experience difficulties in recruiting specialists with the appropriate digital, analytical, or technological qualifications. For this reason, companies are increasingly investing in the development of current employees instead of conducting costly recruitment processes.

Contemporary employee development is considered in three interrelated contexts (Armstrong, 2016; Ulrich, 1997; Pocztowski, 2020; Senge, 2006; Gruenewald and Mueller, 2025): strategic – as an investment in human capital ensuring the ability to adapt to technological and market changes; organizational – as a tool for building a culture of learning and innovation; and individual – as a process of self-development, increasing *employability*, and job satisfaction.

Modern organizations also recognize that competency development positively impacts employee engagement, reduces staff turnover, and strengthens an organizational culture based on lifelong learning. A report by the Polish Agency for Enterprise Development (2025) indicates that companies implementing reskilling and upskilling strategies achieve greater adaptability to technological change and implement innovation more effectively.

The most important factor influencing the development of reskilling and upskilling programs is the digital transformation of the economy. Companies are currently seeking employees with technological, analytical, and interpersonal skills that enable them to function in a highly volatile environment.

Competencies related to data analysis, artificial intelligence, cybersecurity, programming, and the operation of modern IT systems are becoming particularly important. At the same time, the importance of soft skills, such as creativity, adaptability, analytical thinking, and the ability to collaborate in interdisciplinary teams, is growing (Polish Agency for Enterprise Development, 2023).

A report (World Economic Forum, 2025) emphasizes that analytical thinking remains one of the most important competencies of the future, and organizations increasingly expect flexibility and a willingness to continuously learn from employees. In the industrial sector, the development of Industry 4.0 necessitates the acquisition of competencies related to production automation, the operation of cyber-physical systems, and digital process management. In service industries, digital and communication skills enabling hybrid and remote work are becoming particularly important.

Despite the growing importance of reskilling and upskilling, many companies face numerous barriers to effectively implementing development programs. Financial constraints are one of the most significant obstacles (Polska Agencja Rozwoju Przedsiębiorczości (Polish Agency for Enterprise Development), 2022; Noe, 2020).

Comprehensive training programs require significant investment, which does not always yield immediate business results. Small and medium-sized enterprises, in particular, often lack the resources to implement long-term competency development strategies. Another significant barrier is the lack of time to participate in training. The high pace of work and the pressure to meet current business goals mean that employees have limited opportunities to engage in educational and development processes (OECD, 2021; Polish Agency for Enterprise Development, 2022).

Employee resistance to organizational and technological change also remains a significant challenge. Some employees fear new technologies, losing their current professional position, or having to acquire competencies beyond their previous experience. This phenomenon is particularly evident among older employees, who are more likely to experience uncertainty related to digital transformation and adapting to new work models (Polish Agency for Enterprise Development, 2022; Venkatesh *et al.*, 2003; Jabłoński, 2015).

The literature also highlights the mismatch between educational offerings and labor market needs (Dawson *et al.*, 2020; Małopolska Szkoła Administracji Publicznej, Uniwersytet Ekonomiczny w Krakowie, 2024). Information about available training opportunities is often fragmented, making it difficult for companies to select the most effective development solutions.

An additional difficulty is the lack of a systematic approach to competency management within organizations. In many companies, training activities are incidental and unrelated to long-term business strategy.

In the coming years, competency development will primarily focus on digital and technological skills. Competencies related to the use of artificial intelligence, data analysis, and business process automation will become particularly important (World Economic Forum, 2025). At the same time, experts emphasize that technological advancements are increasing the importance of soft skills that cannot be easily replaced by automation, such as creativity, emotional intelligence, problem-solving, and teamwork.

The concept of lifelong learning, which assumes continuous learning throughout one's professional life, is also playing an increasingly important role. Organizations of the future will function as environments supporting the continuous development of employees, and traditional education models will be replaced by more flexible forms of knowledge acquisition (OECD, 2021).

The personalization of learning paths is also an important development direction. By using analytical tools and artificial intelligence, companies will be able to more effectively identify employee competency needs and design individual development programs (LinkedIn, 2023).

3. Methodology

The aim of the research was to identify the current and future competency needs of enterprises, their current employee development practices, and the barriers and drivers of investment in upskilling and reskilling. Particular attention was paid to how employers assess employee competency levels, which skills will become increasingly important over the next five years, and what development initiatives are being undertaken within enterprises.

The study was quantitative in nature, supplemented by a qualitative component. The quantitative research was conducted among 383 employer representatives from the Podkarpackie Voivodeship, representing manufacturing, service, and retail companies. The respondents included owners, board members, and executives with knowledge of staffing needs, training activities, and competency development within the organization.

The data was collected using CATI and CAWI techniques. The questionnaire covered topics related to the current competency levels of employees, the levels currently required, and the expected levels in the next five years. The analysis covered, among others, specialist, analytical, digital, social and communication, organisational and design, green and formal competences.

The forms of development offered or financed by companies, the nature of development activities, the availability of regional educational opportunities, the level of organizational support, motivators for investing in competencies, and barriers limiting such activities were also taken into account.

Before statistical analyses began, data quality was checked, including an assessment of the completeness of the dataset, the accuracy of variable ranges, the time taken to complete the surveys, and the presence of any duplicates. The reliability of the scales used was assessed using Cronbach's alpha. Statistical analyses were conducted by means of SPSS Statistics.

Due to the nature of the data and the possibility that the assumptions required for parametric tests, particularly normality of distribution and homogeneity of variance, nonparametric methods were applied. Their use was also justified by the ordinal nature of many variables and the specific scales used in the questionnaire. Nonparametric tests are particularly useful in analyzing ordinal data and in situations where variable distributions deviate from a normal distribution (Conover, 1999).

The Mann-Whitney U test was used for comparative analyses of two independent groups, while the Kruskal-Wallis H test was applied for comparisons involving more than two independent groups. If statistically significant differences were identified, post hoc analyses were conducted to determine the differences between the groups.

The Spearman rank correlation coefficient, appropriate for ordinal data and monotonic relationships, was used to assess the strength and direction of relationships between variables. For categorical variables, the chi-square test of independence was used to assess the existence of relationships between the analyzed response categories (Agresti, 2007).

The quantitative section was supplemented by 13 individual in-depth interviews with company representatives. The qualitative component allowed deepening the interpretation of the survey results, particularly in terms of the practical understanding of upskilling and reskilling, methods for identifying competency gaps, motivations for investing in employee development, and expectations regarding educational offerings and collaboration with universities.

Qualitative interviews are particularly useful in research on organizational experiences, opinions, and practices, as they allow for capturing the context of respondents' decisions (Kvale, 2007; Silverman, 2020). The qualitative material was subjected to thematic analysis, aimed at identifying the main themes and semantic categories present in respondents' statements.

The analysis covered, among other things, competency needs of enterprises, competency gaps, forms of development support, reasons for reskilling, barriers to upskilling, and opportunities for collaboration between enterprises and educational institutions. The thematic analysis allowed organizing the empirical material and linking it to the main objective of the article.

The adopted research procedure enabled a multidimensional analysis of reskilling and upskilling processes in enterprise practice. Quantitative data allowed us to determine the scale and structure of employer ratings, while qualitative data enabled a more in-depth explanation of the mechanisms behind these ratings.

4. Research Results

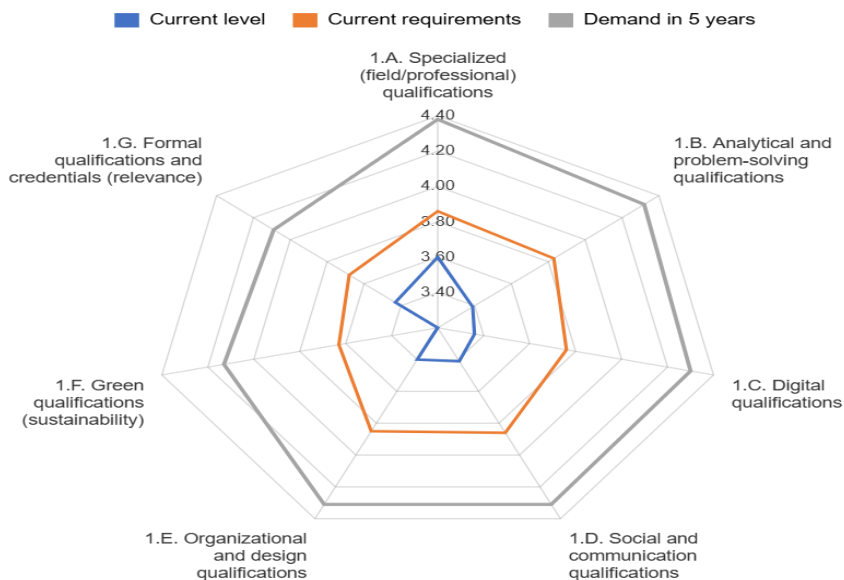
4.1 Competency Needs of Enterprises

The study results indicate a clear discrepancy between the current level of employee competencies and the competencies expected by employers, both now and in the next five years. This phenomenon may be due to the growing pressure for innovation and the increasing technological demands specific to the industries studied.

In the quantitative study, employers assessed employee competencies across three dimensions: current status, current requirements, and projected demand over a five-year period. The highest scores were recorded for specialist qualifications (field and professional). The average score for the current level of these competencies was 3.60, for current requirements - 3.86, and for projected demand over a five-year period - 4.38 (Figure 1).

The competency gap was evident across all competency groups analyzed. Similar levels of discrepancy between the current state and projected demand were observed for analytical skills (3.39/3.83/4.32), social and communication skills (3.41/3.86/4.31), organizational and design skills (3.40/3.85/4.31), and digital skills (3.36/3.76/4.30). The lowest current level of competencies was recorded in the area of green skills related to sustainable development (3.20/3.63/4.13), which may indicate an early stage of development of pro-ecological competencies in the surveyed companies.

Figure 1. Competency groups (scale 1-5)



Source: Own study based on a survey of enterprises ($N=383$).

Also noteworthy is the ranking of formal qualifications and credentials (3.43/3.68/4.09), which, despite their relatively high current level, were characterized by the lowest projected demand among all analyzed competency groups. This result may suggest that employers place greater importance on practical skills than on formal certificates and credentials.

The study results confirm the existence of a competency gap already at the current stage of enterprise operation. At the same time, employer forecasts indicate that competency requirements for employees will systematically increase.

Significant differences were noted between enterprises representing smart specializations in the Podkarpackie Voivodeship, primarily encompassing the aviation, automotive, and IT sectors, and other entities. The entities operating in the area of smart specializations rated the current level of specialized qualifications of their staff lower than other enterprises (3.48 vs. 3.75; $p = 0.005$).

This may indicate that in technologically advanced sectors, the tension between the level of competencies possessed and the requirements resulting from the specific nature of their business is more pronounced.

The quantitative survey results were supplemented by the analysis of individual in-depth interviews (IDI). Both quantitative and qualitative results indicate that the processes of automation, digitization, and the implementation of AI-based solutions are directly impacting changes in competency expectations for employees.

Entrepreneurs indicated that the increased demand for new competencies is primarily due to automation and robotization processes, the development of data analytics, the ongoing digitization of organizations, the growing importance of ESG requirements, and the implementation of solutions based on artificial intelligence and machine learning.

The analysis of the empirical material identified three main areas of the competency gap. These included competencies related to the use of modern digital technologies and AI-based tools, data analysis and interpretation, and the ability to combine technical knowledge with communication skills and understanding business needs. As one entrepreneur pointed out: "(...) we strive to work in a data-driven management spirit. Data analytics isn't easy, but it also requires competencies that humans don't possess (...) we need more and more skills in data analysis, data visualization, data reading, and critical thinking." [IDI 12].

Qualitative research also revealed the intergenerational dimension of the competency gap. Entrepreneurs pointed to difficulties adapting to new technologies, including solutions based on artificial intelligence, particularly among older workers. At the same time, it was emphasized that younger generations, despite their high technological proficiency, often exhibit deficits in soft skills, communication, work organization, and stress resistance. As indicated in one interview: "(...) new generations entering the labor market struggle with communication, time management, and working to standards (...) not only in areas of competencies related to knowledge, but also personality, work attitude, and coping with pressure and stress." [IDI 04].

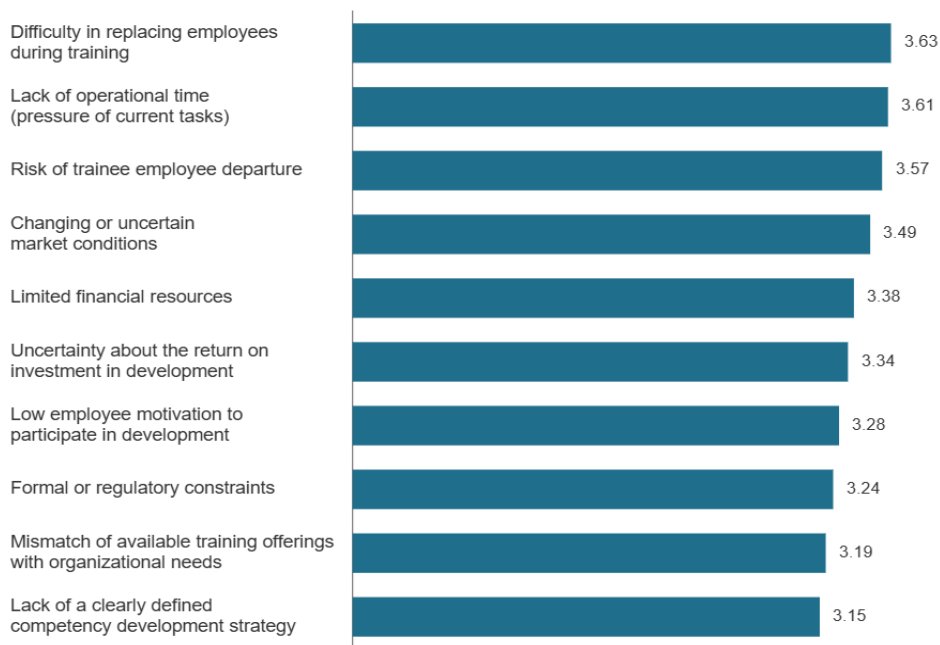
Entrepreneurs also highlighted the difficulties associated with translating technical knowledge into a language understandable by other areas of the organization. This problem primarily concerns the integration of technological competencies with business knowledge and awareness of the impact of technical activities on the company's operations. As one respondent pointed out: "I have a great technologist who can't translate their language into business language for me, and that's a problem, a problem and a challenge. (...) There needs to be a conversation about how well the technologist (...) understands the impact of his actions on the product, cost, quality, and safety." [IDI 13].

The gap in digital competencies among employees who have previously performed tasks in a traditional work model also remains a particular challenge. One employer pointed out that: "The largest gaps are usually visible in digital competencies among certain groups, especially where work has long been paper-based (...)" [IDI 02] Over the next five years, companies anticipate a further increase in the importance of competencies related to digitization, artificial intelligence, data analytics, and organizational change management.

4.2 Barriers to Competence Development

The results of the quantitative research indicate that companies operating in the Podkarpackie Voivodeship face numerous barriers to investing in employee competency development. The analysis of the results identified organizational, operational, and strategic barriers (Figure 2).

Figure 2. *Factors hindering the company from investing in the development of employee competencies*



Source: *Own study based on a survey of enterprises (N=383).*

The highest values were recorded for difficulties related to replacing employees during training (M=3.63), lack of operational time resulting from the pressure of current tasks (M=3.61), and the risk of trained employees leaving for competitors (M=3.57). Lower values were recorded for barriers related to the mismatch between training offerings and the organization's needs and the lack of a clearly defined competency development strategy.

Family business status proved to be a significant factor differentiating approaches to human resources development. Factor analysis revealed that the aggregated subscale "barriers limiting investments in development" had significantly higher values in family businesses than in non-family businesses (3.56 vs. 3.36; $Z=-3.285$; $p=0.001$).

The analysis at the single-variable level identified statistically significant differences for five of the ten barriers analyzed. The differences included: a mismatch between the training offer and the organization's needs ($p<0.001$), low employee motivation to participate in development activities ($p=0.001$), formal and regulatory constraints ($p=0.001$), lack of a clearly defined competency development strategy ($p=0.009$), and uncertainty regarding the return on investment in development ($p=0.024$). In all these cases, higher values were recorded in family businesses, which may be related to a lower level of formalization of management processes, limited organizational resources, and a stronger focus on current operational activities.

Enterprises with foreign capital participation rated the mismatch between training offerings and organizational needs ($p=0.010$), the lack of a clearly defined competency development strategy ($p=0.012$), and low employee motivation to participate in development activities ($p=0.017$) higher.

These results may indicate higher expectations of these enterprises regarding human capital development processes and the organization of training activities. Employment size, however, influenced the assessment of the risk of employee attrition after training ($p=0.024$) and formal and regulatory constraints ($p=0.019$).

Qualitative research confirmed that time constraints and employee operational overload are among the main barriers to competency development. Entrepreneurs indicated that in a dynamic organizational environment, the priority remains the achievement of current goals and tasks, which limits the opportunity to engage in development and training activities.

As one interview pointed out: "In a dynamic work environment, employees focus on achieving short-term goals, which makes it difficult to allocate space for development activities." [IDI 04] An additional barrier is the need to devote personal time to developing competencies, especially in the case of training conducted outside of standard working hours. One employer emphasized that: "If it doesn't happen within my 8-hour workday, but it's something more, I have to sacrifice a weekend, an evening, then here, then that really requires the willingness and motivation of the individual." [IDI 12].

Qualitative research also revealed the significant role of employee attitudes towards change and learning processes. Entrepreneurs highlighted resistance to stepping outside their comfort zones, fear of new technologies, and uncertainty regarding growing organizational expectations and structural changes. As indicated in one interview: "These can relate to both new technologies and upcoming organizational

changes, increased demands, or uncertainty regarding employee expectations following a reorganization.” [IDI 10].

The respondents also emphasized the importance of organizational culture and the role of direct supervisors in shaping attitudes toward competency development. As one employer noted, “A lot also depends on how the supervisor approaches employee development, whether the supervisor is able to prioritize it.” [IDI 02].

Logistical, market, and financial barriers were also cited, primarily affecting companies operating in shift systems, as well as problems related to the limited availability of specialized training and experts in the local market.

As emphasized in the interviews: “The most common barriers are lack of time, task overload, difficulty combining shift work with learning, fatigue.” [IDI 11] and “Barriers: budget constraints, work overload, shortage of specialists in the market, limited local offerings of specialized training.” [IDI 07].

Furthermore, entrepreneurs emphasized that employee resistance to change and difficulty adapting to new ways of working remain significant barriers to reskilling processes. As one interview pointed out: “Reskilling, however, is something that will be much, much more difficult, because it pushes people out of their comfort zones, because it means that once learned, the activity is no longer entirely sufficient.” [IDI 13].

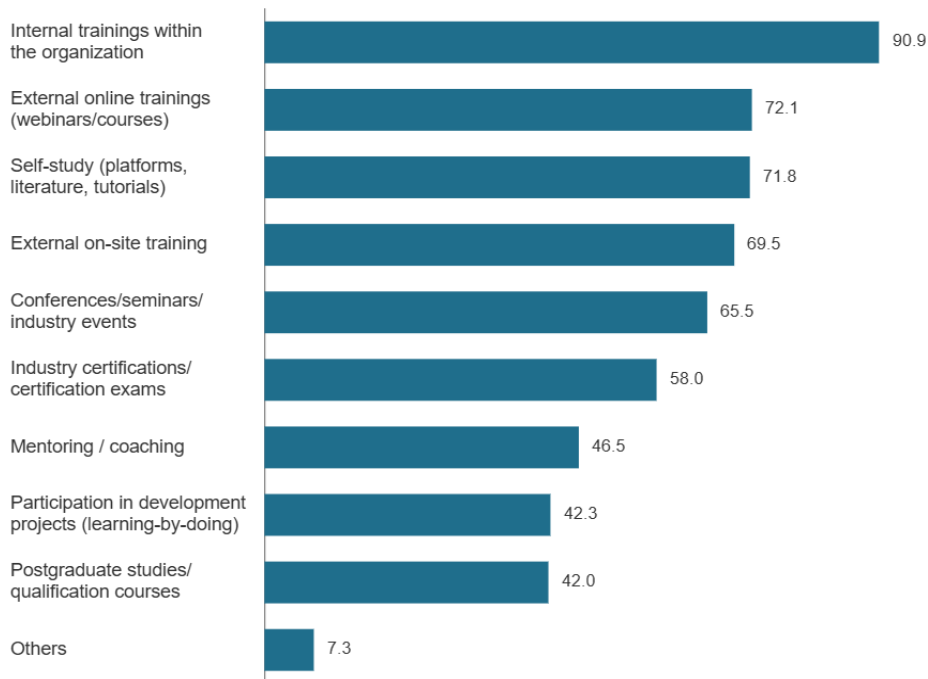
The multidimensionality of the identified barriers indicates the need for a systemic approach to managing competency development, encompassing the operational, strategic, and cultural levels of the organization. This context serves as the starting point for analyzing the competency development directions presented in Sub-section 4.3.

4.3 Directions of Competence Development

The survey results indicate that companies most often offered or financed employee development opportunities based on training (Figure 3). The highest percentage of responses concerned internal training organized within the company (90.9%). This was followed by external online training, such as webinars and online courses (72.1%), self-study through educational platforms, industry literature, and tutorials (71.8%), and external on-site training (69.5%).

The companies also relatively frequently supported employee participation in conferences, seminars, and industry events (65.5%). More than half of the respondents also indicated financing for industry certifications and exams (58.0%). The results show that employee competency development relies on both traditional forms of education and the increasingly widespread use of online solutions.

Figure 3. *Forms of employee development offered or financed by the company in the last 12 months [in %]*



Source: Own study based on a survey of enterprises ($N=383$).

A relatively lower level of indication was noted for forms of development based on practical acquisition of competencies and individual employee support. Mentoring and coaching were offered or financed by 46.5% of the companies, while employee participation in learning-by-doing development projects was indicated by 42.3% of respondents.

A similar percentage also referred to postgraduate studies and qualification courses (42.0%). The study results also show that companies representing smart specializations in the Podkarpackie Voivodeship significantly more frequently applied more advanced and practical forms of competency development.

This primarily concerned mentoring and coaching (56.2% vs. 33.5%; $p<0.001$) as well as employee participation in learning-by-doing development projects (48.9% vs. 33.5%; $p=0.003$). The results may indicate that entities operating in smart specialization areas more often recognize the importance of practical knowledge transfer and competency development through experience and expert collaboration.

Meanwhile, the qualitative study results indicate that it is the relatively less frequently used forms of competency development that employers consider most effective from a return on investment perspective.

During in-depth interviews, entrepreneurs repeatedly emphasized the advantages of practical learning methods over traditional, theoretical forms of education. Competency development achieved through participation in projects, performing practical tasks, and collaborating with more experienced employees was emphasized.

As one employer representative noted: "Of course, much of this development is through practice, i.e., participation in projects and various initiatives, whether as project leaders, team members, or project sponsors." [IDI 12]. Other entrepreneurs also expressed a similar view, pointing out that "Learning-by-doing brings the greatest return in real transformational projects." [IDI 01].

The research also emphasized the importance of mentoring support and the role of superiors in the competency development process. As indicated in one of the interviews: "The greatest return on investment is provided by the combination of learning-by-doing with mentoring and good support from the supervisor." [IDI 11] The results show that companies increasingly recognize the importance of practical and relational forms of competence development, even though they are still used less frequently than traditional training and courses.

In the case of engineering and management staff with strategic experience, postgraduate studies play a significant role. It was emphasized that for this group of employees, " (...) postgraduate studies are the most effective, as they systematize practical knowledge and supplement it with theoretical knowledge (...)." [IDI 03].

The higher frequency of mentoring and development projects in enterprises representing smart specializations in the Podkarpackie Voivodeship, especially in the aviation and IT industries, may be a direct result of the specific nature of these sectors. "The aviation industry requires knowledge of specific standards, a culture of quality, and product responsibility, so employees already operating within the organization adapt to new roles more quickly." [IDI 09].

This means that in such enterprises, competency development based on practice, experience, and knowledge transfer within the organization becomes a more effective solution, while also being safer and less costly from an organizational perspective.

The nature of development activities to date confirms the dominance of a reactive approach. A total of 59.6% of respondents indicated that development activities were largely or very largely a response to current operational needs, while 58.5% attributed them primarily to technological change.

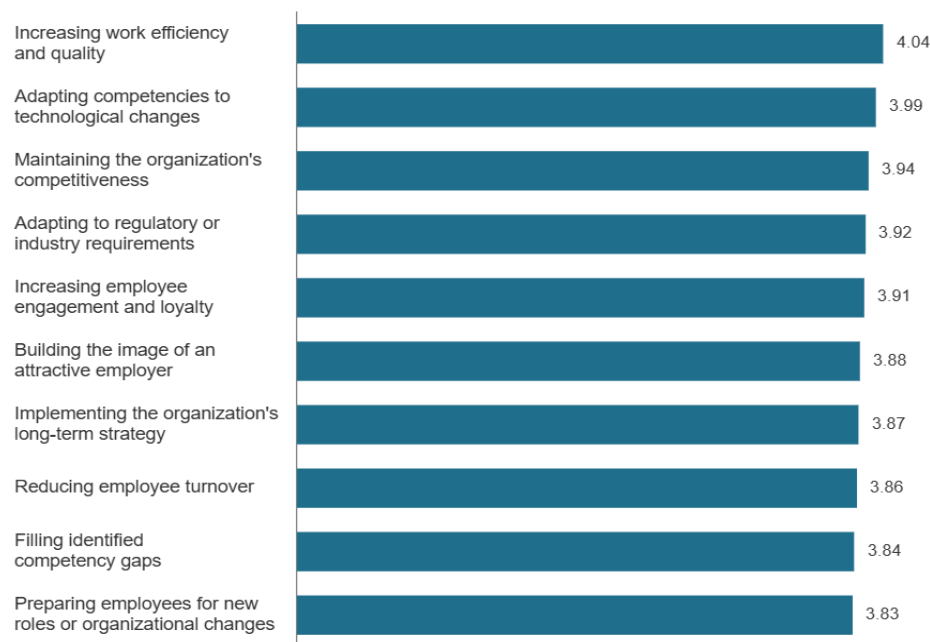
Employee initiative was significantly less likely to be the impetus for development. 42.5% of companies indicated a high level of this dimension, while nearly one in three respondents (29.8%) rated bottom-up initiative as low or nonexistent.

The qualitative study results indicate that this phenomenon stems primarily from operational overload within teams and the companies' focus on achieving short-term goals. Interviews also emphasized that the lack of bottom-up initiative and resistance to reskilling are related to psychological barriers and the perceived personal costs for employees.

Among the factors motivating companies to invest in competency development, the highest scores were given to increasing work efficiency and quality ($M=4.04$) and adapting employee competencies to technological changes ($M=3.99$). High importance was also attached to maintaining the competitiveness of the organization ($M=3.94$) and adapting to regulatory and industry requirements ($M=3.92$).

More strategic factors, such as filling identified competency gaps ($M=3.84$) and preparing employees for new roles or organizational changes ($M=3.83$), received lower ratings, which may indicate a predominance of a short-term and operational approach to competency development (Figure 4).

Figure 4. Factors motivating the company to invest in the development of employee competencies



Source: Own study based on a survey of enterprises ($N=383$).

In terms of organizational support, over 70% of the companies confirmed that employees had the opportunity to use their new skills in practice (70.2%) and could count on support from their superiors in planning their professional development (71.5%). At the same time, only 54.6% of respondents indicated

a clear process for identifying development needs. Lower percentages were also noted regarding the alignment of development options with the requirements of upskilling (60.0%) and reskilling (56.1%).

The availability of competency development options in the Podkarpackie Voivodeship was rated moderately. 45.2% of respondents rated reskilling options positively, while 44.9% rated upskilling options positively. These results are consistent with observations from qualitative studies, in which entrepreneurs indicated the limited attractiveness of regional training opportunities. As noted in one interview: "(...) the training offer in our region is unattractive. Most of the training courses I send my people to [...] are in Katowice, Krakow, or even Zakopane." [IDI 06].

Taking into account the identified competency gaps (Sub-section 4.1.), the diagnosed development barriers (Sub-section 4.2.), as well as the hierarchy of investment drivers and the structure of training methods used, four main directions of competency development in the region can be identified.

These directions result primarily from the growing discrepancy between the current level of employee competencies and the projected demand from enterprises over a five-year period, particularly in the areas of digital, analytical, specialist, and sustainable development competencies. The qualitative research results also indicate the growing importance of interdisciplinary competencies, combining technical knowledge with communication and business competencies.

The first, dominant development direction is technological and adaptive in nature and encompasses the development of digital competencies, the use of artificial intelligence-based tools, and data analytics. This direction addresses one of the strongest drivers of investment in competency development: adapting to technological change ($M=3.99$), and at the same time corresponds to one of the largest identified competency gaps (digital qualifications: 3.36 vs. 4.30 over a five-year period; a gap of 0.94 points).

A similar scale of shortages was also noted for analytical and green qualifications (gaps of 0.93 points each), indicating their crucial importance in the competency transformation process of enterprises. Qualitative research results confirm the priority importance of this area. As indicated in one interview: "I think that in the next five years, the most significant changes will be in terms of data analytics, data reading, and processing large amounts of data, which will allow for better decision-making." [IDI 12].

The implementation of this direction encounters barriers primarily related to the shortage of operational time and the limited availability of specialized training in the region. The second direction of development concerns the development of specialist and field-specific qualifications, which were characterized by both the highest

current level (3.60) and the highest projected demand among all analyzed competency groups (4.38). Despite the relatively smaller competency gap in this area (0.78 points), the highest level of future expectations indicates the need for continuous improvement of competencies that constitute the foundation of enterprise operations.

The results of qualitative studies confirm the particular importance of specialist technical competencies. Employers primarily emphasized the importance of skills related to the operation of CNC machines, welding, and aerospace engineering, emphasizing that these competencies form the foundation of technical enterprises and determine the ability to implement production processes in accordance with technological requirements.

The third development direction encompasses green competencies related to sustainable development. This area was characterized by the lowest current level of all analyzed competency groups (3.20 points) and one of the largest competency gaps (0.93 points), which may indicate an early stage of development of pro-ecological competencies in the surveyed companies. At the same time, qualitative research results indicate a projected increase in the importance of this area in the coming years.

As one employer noted: "In the next five years, the following may be key: further tightening of environmental regulations, restrictions on the use of plastics, and the growing importance of the circular economy in national and EU policies." [IDI 05].

This direction also corresponds to the relatively lowest projected demand for formal qualifications and certifications (4.09 points), which may suggest that companies primarily expect practical competencies related to sustainable development, not solely formal certificates.

The fourth development direction, emerging primarily from the qualitative analysis, concerns hybrid competencies that combine technical knowledge with soft and business skills. Employers repeatedly emphasized the need to train employees with interdisciplinary profiles who can combine engineering competencies with an understanding of business processes and the ability to collaborate.

Research shows that in the five-year perspective, the development of interdisciplinary competencies, rather than narrow specialization, will be crucial. In-depth interviews emphasized that: "If I had to choose one priority, I would say: developing people who can combine high technical competencies with mature collaboration and responsible leadership." [IDI 11].

Another employer, in turn, indicated that: "[...] it's a bit of an automation engineer, sometimes it's a bit of a data engineer. Sometimes it's a production engineer position, which is undervalued, because it's a production engineer, a bit of a technologist, a bit

of an analyst, a bit of a businessman [...].” [IDI 13].

This trend is also evident in the context of low employee grassroots initiative in competency development (42.5% of high responses) and the limited formalization of the diagnosis of development needs (54.6%). These results indicate the growing importance of leaders supporting learning and competency development processes in the organization.

The factor analysis confirmed the three-dimensional nature of the approach to competency development in the organizations under the study, encompassing: (1) strategic and cultural conditions for development, (2) barriers limiting investment in development, and (3) the nature and directions of development activities. The subscale regarding the nature and directions of development activities was significantly differentiated by the scope of the companies' operations ($p < 0.001$).

International companies achieved a mean of 3.67, compared to 2.86 for local companies. Significant differences were also noted by the share of foreign capital ($p = 0.001$) and employment size ($p = 0.027$). The results indicate that a more proactive and strategic approach to competency development is more common in larger-scale enterprises with more complex organizational structures, while local and small companies remain predominantly reactive.

The identified directions of competency development indicate the growing importance of digital, specialized, green, and hybrid competencies. The study results also support the need to move away from a reactive model of competency development towards a more strategic and practical approach.

5. Conclusions, Proposals, Recommendations

The research indicates that the competency development model in the companies under the survey is characterized by significant internal tension. On the one hand, employers identify growing competency gaps and emphasize the high effectiveness of advanced development methods such as mentoring and learning-by-doing.

On the other hand, the dominant model remains reactive and relies primarily on traditional internal training (90.9%), and its transformation is limited by organizational and time barriers identified in Section 4.2.

The results correspond to the forecasts of the World Economic Forum (2025) and the observations of the OECD (2021) and the Polish Agency for Enterprise Development (2022). In the context of reskilling and upskilling, the research indicates that upskilling is relatively common, while reskilling encounters significantly greater employee resistance and requires more advanced organizational support, confirming the observations of Gruenewald and Mueller (2025).

The analyses indicate four main directions of competency development, technological-adaptive, specialized, pro-ecological, and hybrid.

The results confirm the need to move away from a reactive training model towards a more strategic and practical approach to competency development. These results indicate that the main challenge faced by the surveyed companies is not a lack of awareness of the importance of competency development, but rather limited organizational capacity to implement systemic, long-term, and practical development activities.

The results also indicate the need to strengthen practical forms of learning, particularly mentoring, learning-by-doing, and digital and hybrid skills development programs. Increasing the availability of specialized forms of skills development in the region is particularly important, especially in the areas of digitalization, data analytics, green transformation, and the development of hybrid skills.

Employers are recommended to gradually implement practical forms of development, and systematically assess competency needs. Educational institutions are advised to better tailor their offerings to the specifics of the regional labor market, and at the regional policy level, it is advisable to support systemic solutions, including through the instruments of the National Recovery Plan.

The study is limited by the regional nature of the research sample and its focus on the employer perspective. Future research should also consider the employee perspective and conduct comparative analyses across other regions and industries.

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