The Impact of Transversal Skills on the Efficiency and Adaptability of the Workforce in the IT Industry

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Abstract

The IT industry is characterized by an accelerated pace of technological innovation and a high degree of uncertainty, which requires employees not only to master technical skills, but also to develop transversal skills that support their performance and adaptability. This paper investigates the impact of transversal skills – such as critical thinking, communication, problem-solving skills, teamwork and lifelong learning – on professional effectiveness and adaptation to change among IT specialists. The analysis is based on a systematic review of the literature and on modeling the relationships between non-technical skills and individual performance indicators. The results highlight that these skills significantly contribute to improving employees' ability to quickly integrate new technologies, manage complex projects and collaborate effectively in multidisciplinary teams.

Keywords: *transversal skills, IT industry, professional efficiency, adaptability, performance*

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1. Introduction

In the context of the profound transformations of the IT industry, generated by the advance of artificial intelligence and the contraction of the labor market, it becomes essential to identify the current competencies required by specialists in the field. In this regard, the study analyzes the essential competencies for employability in the IT sector, having as a starting point the framework of collaboration between public administrations, economic operators and universities, consolidated by the introduction of dual university education. In addition to economic and educational initiatives, public administration plays a major role in supporting education in the

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field of ICT (Information and Communications Technology) by creating policies, allocating funds, ensuring accessibility and promoting partnerships between educational institutions and the technology industry (Jeunet& Bou Orm, 2020).Thus, public administration becomes an essential factor in shaping the digital future, contributing to an inclusive, quality ICT education adapted to the requirements of the labor market (Hanushek et al., 2015).

In this context, the present study examines the validity of the theory that transversal competencies are essential for the IT industry, analyzing the perceptions of employers and specialists in the field. The research classifies these competencies based on their relevance in the recruitment and professional integration process, identifying both competencies considered indispensable and those perceived as competitive advantages, but not critical (Henao et al., 2023).

This approach allows for a better understanding of the role of transversal skills in the professional success of graduates and professionals in the IT industry (Mourtzis, 2020) As a direct partner, the involvement of public administration in the effective implementation of dual education is crucial to ensure an efficient correlation between the educational offer and the demands of the labor market (Gu& Tayi, 2023). This can facilitate the development of adapted educational policies, the allocation of financial resources for infrastructure and the creation of sustainable collaboration mechanisms between educational institutions and the business environment. Public administration also plays an essential role in stimulating partnerships with the private sector, through legislative and fiscal initiatives that encourage companies to actively engage in the training of the future workforce (Fatorachian& Kazemi, 2021).

2. Literature Review

The research is based on the Human Capital Theory (Becker, 1964), the PRISMA methodology (Alemayehu& Tveteraas, 2020) and data obtained from the latest LinkedIn, BestJobs and eJobs reports. In addition, the study assesses whether these transversal skills are found in the COR (Romanian Classification of Occupations). According to the Human Capital Theory (Becker, 1964), investment in education and skills development is a determining factor for increasing individual productivity and economic performance. On the other hand, the PRISMA methodology applied by Abelha et al. (2020) shows that the university must support the development of transferable skills such as communication, critical thinking, adaptability and leadership in order to increase the employability of graduates.

Reports by LinkedIn, BestJobs and eJobs highlight that the job market is increasingly focusing on hybrid skills, which combine technical expertise with interpersonal skills, critical thinking and the ability to adapt to new emerging technologies, such as artificial intelligence.

The specialized literature emphasizes that the IT industry is not only based on technical skills (hard skills), but also increasingly requires the development of transversal skills (soft skills), such as critical thinking, communication, problem

solving, adaptability and continuous learning (Alvarez et al., 2020). These skills facilitate the rapid integration of new technologies and allow employees to respond effectively to dynamic changes in the work environment.

Empirical studies highlight that employees who possess developed transversal skills perform better in managing complex projects and collaborating in multidisciplinary teams (Banerjee et al., 2007). Professional effectiveness is positively correlated with communication and problem-solving skills, which reduce the time required to complete tasks and improve the quality of IT products and services (Fornino& Manera, 2022).

Adaptability to change is a critical element in the IT industry, characterized by continuous innovation and projects with fluctuating requirements. According to the literature, transversal skills enhance the ability of employees to adapt to new technologies and work methodologies, to manage professional stress and to contribute to organizational resilience (Barkokebas, Al-Hussein, & Hamzeh, 2023; Castex& Dechter, 2018).

Although numerous studies highlight the benefits of transversal skills, there are still gaps in objectively measuring their impact on individual and organizational productivity in the IT industry. Furthermore, the literature suggests that the effectiveness of these skills may vary depending on the level of seniority, organizational culture and the specifics of IT projects (De Spiegelaere, Van Gyes& Van Hootegem, 2014).

3. Research Methodology

This research uses a mixed methodology, combining qualitative and quantitative methods to provide a detailed perspective on the essential skills in the IT industry. The qualitative component consists of conducting semi-structured interviews with IT professionals, academics and a public administration actor, while the quantitative component is based on the application of a structured questionnaire. The qualitative research method follows the principles formulated by Nelson (2017) in the work Series: Practical Guidance to Qualitative Research. Part 4: Trustworthiness and Publishing, in which the authors argue that semi-structured interviews are an essential tool for investigating individual perceptions. This approach allows flexibility in adapting the questions to each participant, facilitating a detailed exploration of complex topics, such as the impact of dual education on employability in the IT sector.

In parallel, the research includes an analysis of the Romanian Occupation Classification (COR) to assess to what extent this structure reflects the real requirements of the IT industry. The COR provides an official reference base for defining occupations, but the analysis carried out in this study aims to identify discrepancies between the competencies mentioned in this framework and the skills actually needed on the labor market. This dual approach - employers' perception and analysis of the official occupational framework - allows for a complete assessment

of the skills needs in the IT industry, contributing to proposing directions for improving the educational system and employment policies.

The sample selection was carried out through purposive sampling, having as the main criterion experience in recruitment and human resources management in the IT industry. To ensure diversity of views, respondents from companies of different sizes in Bucharest, an important IT center in Romania, were included.

The data were collected through online interviews lasting approximately one hour, ensuring confidentiality by coding the identity of the participants and anonymizing the companies. Thematic analysis of the interviews highlighted the main trends in the skills needed in the IT industry, and the results were correlated with data from a questionnaire applied to a sample of 50 IT professionals.

The questionnaire targeted nine essential skills, assessed on an ordinal scale ("essential", "an advantage but not essential", "not important"). The quantitative analysis included the calculation of absolute and relative frequencies, highlighting the priority skills for employers and the differences between sectors.

To validate the results, the questionnaire was pre-tested on a small group of employers, and data triangulation was performed by comparing the answers from the interviews and the questionnaire. The anonymization of participants and companies was maintained to protect confidentiality. This mixed approach provides a detailed perspective on the requirements of the IT market and supports the optimization of educational strategies for the training of future specialists.

The methodology used not only highlights the essential transversal skills for the IT industry, but also provides a reference framework for public administration in order to update educational and occupational policies.

4. Results and Discussion

Practical experience plays a crucial role in the integration of graduates into the labour market, reinforcing the importance of on-the-job training and internships as an integral part of education. This confirms the relevance of the concept of on-the-job training, described by Becker. In addition, lifelong learning is becoming an essential element in a rapidly changing professional environment, where adaptability and constant improvement are indispensable.

These findings support the idea that employability does not depend exclusively on obtaining a diploma, but, above all, on the practical and transversal skills developed throughout the educational process.

According to the European Digital Competence Framework for Citizens (DigComp) (European Commission, 2022; European Commission), digital literacy presupposes the critical and responsible use of technologies, including information management, online collaboration, cybersecurity and digital content creation. Business Insider emphasizes the need to combine technical expertise with interpersonal skills, such as communication and leadership (Business Insider, 2024).

According to LinkedIn Learning & Workplace Reports (LinkedIn, 2024), transversal skills are considered essential in modern recruiting because they allow

employees to quickly adapt to changes in the industry. LinkedIn defines transversal skills as "interpersonal and cognitive skills that are applicable across a wide range of professional roles and contribute to individual and organizational productivity."

Communication is essential, as the ability to convey information clearly and effectively, both in writing and verbally, plays a crucial role in most roles. Critical thinking and problem solving are essential skills for analyzing complex situations, and adaptability and flexibility allow for continuous learning in a dynamic professional environment. Emotional intelligence and leadership are also increasingly valued, along with creativity and innovation – factors that can differentiate an employee and add value to an organization. These skills reflect current job market demands and are essential for the professional success of new employees (LinkedIn, 2025).

Skills highlighted in LinkedIn, BestJobs, eJobs reports

Table 1

Skills	LinkedIn	BestJobs	eJobs
Industry-specific technical skills	x	x	x
Critical thinking and problem solving	x		x
Communication skills	x	x	x
Adaptability and flexibility	x	x	x
Teamwork	x	x	x
Emotional intelligence	x	x	x
Leadership skills	x	x	x
Digital skills	x	x	x
Creativity and innovation	x	x	x
Lifelong learning		x	x
Time management	x		

Source: LinkedIn, eJobs, BestJobs (2024)

Based on the interviews conducted, essential transversal skills were identified for the integration of graduates in the IT field, skills that go beyond technical skills and are essential for adaptability, innovation and efficiency.

Collaboration and teamwork are poorly developed in the Romanian university system, affecting the integration of graduates into the professional environment. R1 states that "one of the biggest drawbacks of the Romanian university system is that students do not collaborate. Instead of teamwork, there is only individual work, which affects their ability to ask for help or manage failures in a collective setting." R8 confirms that "in non-technical positions we can juggle the level of education more easily, but in technical positions we are interested in seeing if the person can work effectively in a team."

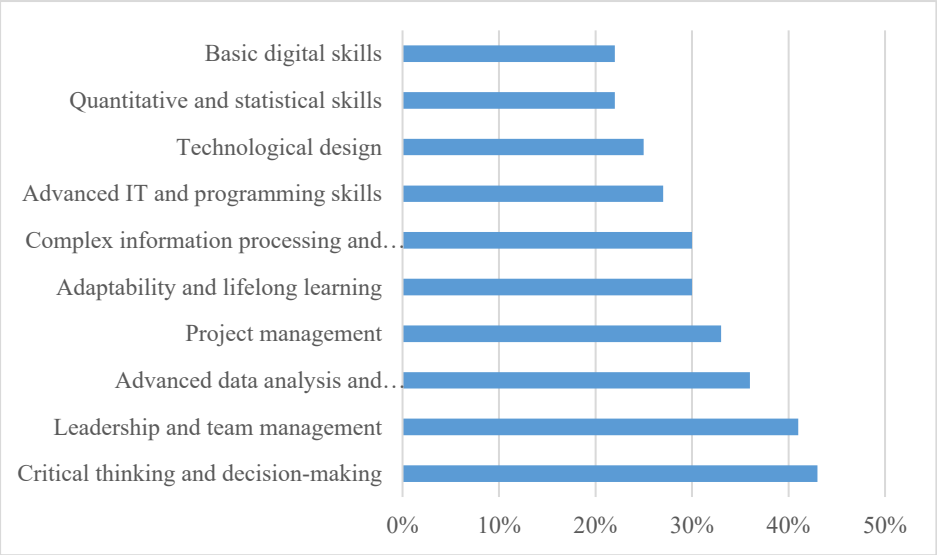

Figure 1. Prioritized skills for retraining
Source: LinkedIn (2025)

Effective communication and logical thinking are essential for professional success, including in technical roles. R10 states that "writing an effective AI prompt requires vocabulary, logic, and creativity. These skills are neglected in formal education, even though they should be essential." R7 adds that "even in technical roles, we need people who can express themselves clearly and coherently. We look at the ability to structure a response, write a proper email, or present a report."

Creativity and adaptability are becoming increasingly important in an ever-changing technological landscape. R4 notes that "in the past, programmers focused only on programming languages and algorithms. Now, with AI and large language models (LLMs), people with creativity and the ability to build ideas in a logical way are needed." R6 emphasizes that "the best results are achieved by those with flexible thinking and a desire to continuously learn."

Flexibility and the ability to work in multidisciplinary environments are increasingly needed. R8 notes that "many people who enter IT only for the high salaries end up stuck at junior level and experiencing frustration." R9 emphasizes that "a good professional must understand technology, but also be able to work effectively with people from other fields." Time management and effective organization are essential in the industry. R5 states that "prioritizing tasks and organizing time are very important aspects in employee evaluation. They are not taught in university, but they are essential in the industry." Leadership and taking responsibility are essential for professional progress. R6 states that "managers must be prepared not only from a technical point of view, but also to take responsibility for their decisions." R8 emphasizes that "the employees who evolve the fastest are those who take responsibility and learn to lead teams."

Emotional intelligence and interpersonal relationship management influence professional success and team cohesion. R6 mentions that "managers must know how to use emotional intelligence to manage diverse teams." R1 adds that "people must learn to manage failures and not take them personally. In a team, success and failure are collective."

Analyzing the theory that transversal skills play an essential role in increasing employability, we developed a questionnaire designed to validate this statement by expanding the respondent base. In this regard, we opted for a data collection tool addressed to IT managers, with responsibilities in the recruitment and selection process.

After eliminating the 12 respondents who did not actively participate in recruitment and the 2 respondents whose identity could not be confirmed, we observe that 26 (65%) of the respondents are from the Technology, Innovation and Research sector, 6 (15%) Industry, 3 (7%) Commerce and Logistics, 5 (7%) Professional and Social Services.

To determine the importance given to each skill by respondents, we analyzed the frequency distribution by calculating the absolute number of responses and the percentage of total participants who considered each skill to be "essential," "an advantage but not essential," or "unimportant." The descriptive analysis included both absolute frequencies, which indicate the total number of respondents who selected a particular option, and relative frequencies, expressed as percentages, which reflect their proportion relative to the total sample.

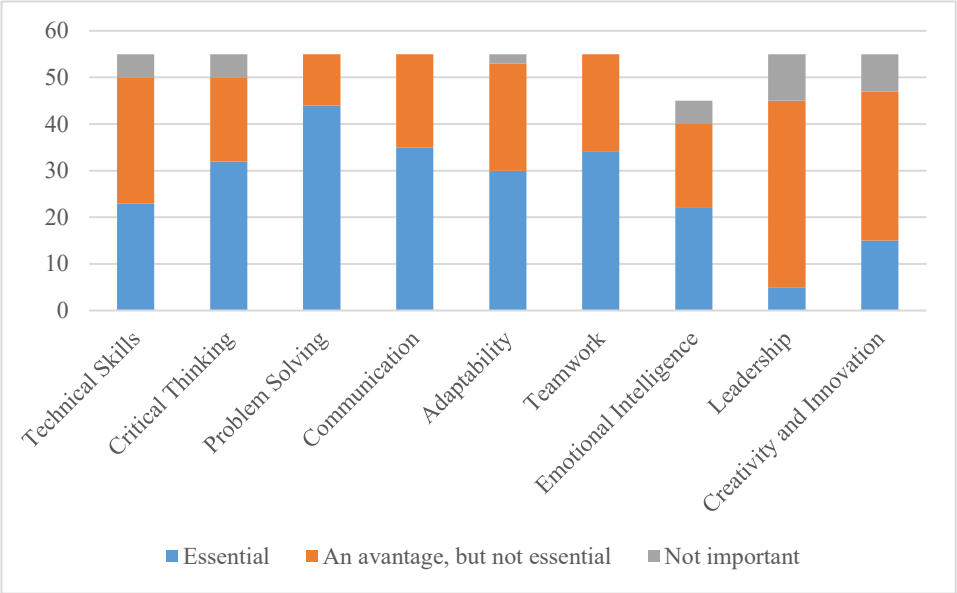

Figure 2. Skills assessment in the hiring process
Source: author

Other skills considered essential include communication skills, rated as indispensable by 68.52% of respondents. Teamwork was considered essential by 64.82% of participants, and critical thinking was recognized as a fundamental

competence by 57.42% of them. Adaptability and flexibility were also selected as essential by 55.58% of respondents.

As for the skills with the lowest perception of "essentiality", critical thinking and adaptability were rated as "an advantage, but not essential" by approximately 35-45% of respondents. Very few participants, less than 3%, marked these skills as "unimportant".

The analysis of the competencies associated with these codes revealed a limited and ambiguous presence of transversal competencies. Although ESCO includes skills such as communication, critical thinking and teamwork, these are not explicitly mentioned in the COR for the majority of IT occupations.

Some examples of competencies identified, but whose relevance as transversal skills is questionable, include ICT innovation, which involves creating and describing original research and innovation ideas, compared to emerging trends, which can be associated with creativity and critical thinking. Identifying customer needs is a skill that involves using appropriate questions and active listening to understand their requirements, but it is mainly applied to sales specialists. Using experience mapping involves analyzing user interactions with a product or service and evaluating key variables, which may involve critical thinking.

Professional interaction in research and professional environments includes demonstrating collegiality, providing feedback, and supporting the development of colleagues, which could be considered an indicator of effective communication. Synthesizing information, interpreting, and summarizing complex data from various sources are aspects that can be associated with analysis and critical thinking. Guiding people involves providing emotional support, counseling, and adapting the approach to the needs of the individual, and can be associated with leadership and mentoring. Interpreting technical texts involves reading and understanding specialized documentation, but this is more of a technical than a transversal skill.

Developing creative ideas includes generating artistic and innovative concepts, and is correlated with creativity. Interviews with employers confirmed that most IT companies do not use COR in the recruitment process, considering it a bureaucratic formality with no practical relevance. This finding is also supported by the answers provided during the interviews, where participants indicated that the occupational classification does not reflect the reality of the industry and does not provide a useful framework for recruitment and professional development.

Thus, the results of the analysis suggest the urgent need to update the occupational classification in the IT industry to reflect the real demands of the labor market and to include a clear delimitation of essential transversal skills. Interviews with employers in Cluj-Napoca highlight that the COR register is not perceived as a relevant tool for the IT industry. Occupational descriptions are often not adapted to the reality of the field, and their updating is considered a cumbersome process.

Many employers use standard titles only for administrative compliance, without them accurately reflecting the attributions of the jobs. In addition, official registers do not influence recruitment, which is based on skills and technical interviews, while diplomas are only taken into account for tax benefits.

Some respondents admit that they have not interacted directly with this system or consider it a bureaucratic formality with no real impact. Also, in the case

of acquisitions and internal restructurings, the formal inclusion of employees in official registers does not effectively influence their activity. Small companies and startups interact very little with this system, and large companies set their own evaluation standards. The conclusions suggest that the COR register requires more frequent updating and better correlation with labor market requirements, through closer collaboration between academia, the private sector and authorities.

5. Conclusion

To meet the demands of the IT industry, education must place greater emphasis on the development of transversal and digital skills. Professional success depends not only on technical expertise, but also on skills such as critical thinking, effective communication, teamwork and the ability to adapt to new technologies. Digital skills are becoming increasingly relevant, including the effective use of emerging technologies, data management and programming fluency.

Closer collaboration between universities and the IT industry is essential to facilitate the transition from education to employment. Curriculum adaptation must include both technical skills training and the development of transversal skills. At the same time, practical internships, reskilling and upskilling programs are crucial to maintain the competitiveness of graduates in the labor market.

A major aspect identified in this study is the need to adapt and revise the National Qualifications Register, which does not adequately reflect transversal skills and the current requirements of the IT industry. In this sense, it is imperative to update occupational codes for emerging roles, recognize transversal skills as essential elements in professional assessment and develop a mechanism for periodic updating of the register, through constant collaboration with employers and academia. Thus, the National Qualifications Register could become a real support tool for professional career development, not just a bureaucratic formality.

Public administration, having an essential role as a partner in the implementation of dual education programs, is not only directly interested in the real demands and needs of the labor market, but can and must actively contribute to the development of successful educational programs. By closely collaborating with educational institutions and the business environment, the administration can support the creation of educational paths that specifically respond to industry requirements, facilitating the transition of young people to well-paid jobs aligned with current technological trends.

For the IT industry to remain competitive and to ensure an efficient transition from education to employment, public administration must adopt proactive policies, such as updating the Romanian Occupation Classification (COR) to reflect the new essential IT skills, creating modern educational spaces by investing in coworking hubs and innovation labs where students can develop practical projects, expanding dual education programs and facilitating collaborations between universities and companies through fiscal incentive policies for employers offering internships, as well as developing lifelong learning mechanisms that allow for the reskilling and upskilling of IT professionals, supported by public and private funding. Thus, the results of the study provide not only a clear picture of labor market

requirements, but also a set of fundamental recommendations for policymakers who want to modernize education and support the professional integration of graduates.

Universities must continuously adapt their study programs to prepare flexible and competitive graduates, able to respond to the changing demands of the labor market, while public administrations must play an active role in creating a favorable framework for this adaptation, facilitating collaboration between educational institutions and the economic environment. At the same time, economic operators must be actively involved in defining educational curricula, thus ensuring a real correlation between the skills acquired by graduates and the concrete needs of the industry. This change will contribute to creating a workforce better prepared for the dynamics of the IT market and to increasing the employability of graduates.

References

1. Alemayehu, F. K., & Tveteraas, S.L, (2020). Long-run labour flexibility in hospitality: A dynamic common correlated effects approach. *Tourism Economics*, 26(4), 704-718.
2. Alvarez, E., Ferrer, J.-C., Muñoz, J. C., & Henao, C.A. (2020). *Efficient shift scheduling with multiple breaks for full-time employees: A retail industry case*. Computers and Industrial Engineering, 150, 106884
3. Banerjee, A., Cole, S., Duflo, E., & Linden, L. (2007). Remedying education: Evidence from two randomized experiments in India. Quarterly *Journal of Economics*, 122(3), 1235-1264
4. Barkokebas, B., Al-Hussein, M., & Hamzeh, F. (2023). Assessment of digital twins to reassign multiskilled workers in offsite construction based on lean thinking. *Journal of Construction Engineering and Management*, 149(1), 04022109
5. Castex, G., & Dechter, E. (2018). A model of labor supply, fixed costs and work schedules. *Journal of Monetary Economics*, 95, 32–48.
6. De Spiegelaere, S., Van Gyes, G., & Van Hootegem, G. (2014). *Labour flexibility and innovation, complementary or concurrent strategies? A review of the literature*. Economic and Industrial Democracy, 35(4), 653-666
7. Fatorachian, H., & Kazemi, H., (2021). *Impact of Industry 4.0 on supply chain performance*. Production Planning & Control, 32(1), 63-81
8. Fornino, M., & Manera, A. (2022). Automation and the future of work: Assessing the role of labor flexibility. *Review of Economic Dynamics*, 45, 282-321
9. Gu, Z.J., & Tayi, G.K. (2023). *Consumer self-design and brand competition*. Production and Operations Management, 32(8), 2420-2437
10. Hanushek, E., Schwerdt, G., Wiederhold, S., & Woessmann, L. (2015). Returns to skills around the world: Evidence from PIAAC. *European Economic Review*, 73(C), 103-130.
11. Henao, C. A., Mercado, Y. A., González, V. I., & Lüer-Villagra, A. (2023). Multiskilled personnel assignment with K-chaining considering the learning-forgetting phenomena. International Journal of Production Economics, 265, 109018
12. Jeunet, J., & Bou Orm, M., (2020). Optimizing temporary work and overtime in the time cost quality trade-off problem. *European Journal of Operational Research*, 284(2), 743-761
13. Mourtzis, D. (2020). Simulation in the design and operation of manufacturing systems: State of the art and new trends. *International Journal of Production Research*, 58(7), 1927-1949
14. Nelson, E. (2017). *Learning through the ages: How the brain adapts to the social world across development*. Cognitive Development, 42, 84-94.