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Reskilling and Upskilling in Portugal Amidst Digital and Green Transformation

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Abstract: Continuous learning has become a critical priority in the global economic environment nowadays, driven by rapid digital transformation, environmental challenges and shifts in production and organisational models. The study focuses on reskilling and upskilling to prepare the Portuguese workforce for the evolving demands of the labour market. Its objective is to investigate the gap between current human capital skills and future labour market requirements. By identifying structural mismatches between educational provisions and business sector demands, the research employs a qualitative, documentary methodology, analysing secondary data from international reports that consider skills development, labour market forecasts, and global skilling trends. The findings indicate discrepancies between national qualification frameworks and the skills required by firms in emerging economic markets. There is an urgent need to accelerate qualification processes and implement future-oriented strategies to address the skills gap, as adapting to new business models and technological innovation is crucial for maintaining competitiveness. The study aims to promote coordinated efforts among policymakers, educational institutions, and stakeholders to establish agile and adaptable qualification systems that equip the workforce for a complex global economy. It provides valuable insights for decision-makers seeking to enhance the resilience, adaptability, and competitiveness of the national workforce, based on European forecasts of future skills.

Keywords: Reskilling, Upskilling, Policymakers, Sustainability, Digital Transformation, Green Transformation

1. Introduction

Globalisation, technological advancement, and demographic shifts are major trends significantly influencing the labour market. These are affecting the quantity and quality of accessible employment, as well as the execution of tasks and the competencies required in an increasingly competitive environment (OECD, 2018).

From 2000-2015, significant advancements in the global economy included reductions in working poverty and child labour, though wage growth has stalled and inequality has risen. Resource extraction and waste generation continue to be relied upon in economic growth patterns (International Labour Organization 2018). The green transition is expected to significantly transform the global labour market, with macro-trends such as technological advancements, economic instability, environmental stability, and demographic shifts reshaping employment dynamics (World Economic Forum, 2025).

Mechanisms examples for a just transition towards environmentally sustainable economies and societies to integrate and promote decent work are the Sustainable Development Goals (SDGs) and the International Labour Standards (ILO) Guidelines (CEDEFOP & UNESCO-UNEVOC, 2025).

Based on projections to 2030 alighned with the established policy objective of restricting global warming to 2°C, ILO analysis assesses assesses employment losses and gains during the transition to a green economy. More broadly, it concludes that the environmental enhancement of economies can yield a beneficial impact on growth and employment (International Labour Organization, 2018).

The European Green Deal was introduced by the European Commission in 2019 to transform the EU into the first climate-neutral continent by 2050 (European Commission, 2019). The "Fit for 55" package proposes revising EU regulations to align with climate objectives (European Council, 2025; Regulation (EU) 2021/1119 European Climate Law, 2021). Although mitigation measures may cause temporary job losses, legislation can mitigate their negative effects on GDP growth, employment, and inequality (International Labour Organization, 2018).

Digital transformation, green transition and continuous change, reskilling and reskilling have become increasingly essential in the context of the global economy. This exploratory study investigates the gap between current human capital skills and future labour market trends in Portugal, using a qualitative, document-based methodology. It analyses secondary data from international reports on skills development, labour market forecasts and global skilling trends.

In the OECD Survey of Adult Skills (2022-23), adults in Portugal aged 16 to 65 scored below the OECD average in literacy, numeracy, and problem-solving skills. For instance, older adults (aged 55-65) demonstrated lower

proficiency than young people (aged 25-34) in literacy, numeracy, and adaptive problem-solving. Therefore, the skill gaps between older and younger adults may reflect effects associated with ageing, as well as differences in the quality and quantity of education and training between generations (OECD, 2024).

Additionally, CEDEFOP (2023b) identifies 12 skills challenges for Portugal, including improving equity and quality education; improving VET responsiveness to labour market demands; promoting adult education and lifelong learning for low-skilled individuals; addressing youth unemployment and NEETs (Not in Employment, Education and Training) (CEDEFOP, 2025), facilitating labour market re-entry for long-term unemployed; lowering employment barriers; encouraging entrepreneurship and innovation; creating high-skilled jobs; providing incentives for SMEs to invest in skills development; financing fair and efficient skills system; aligning decision-making with local needs; and fostering partnerships for evidence-based skills policy (CEDEFOP, 2023b).

This paper begins with an introduction to various concepts alongside current forecasts of future jobs and skill needs in the labour market, which include data on the aspects considered most relevant in international reports. The methodology is then presented, and the paper concludes with the results and brief discussion of the top 5 skills of the future in Europe and Portugal, respectively, followed by the concluding remarks and references.

2. Literature Review

The literature review consolidates terms such as reskilling, upskilling, digital skills, and green skills, as defined by renowned international institutions. Currently, there is no universal glossary to standardise these concepts, leading to varied, context-dependent interpretations by different organisations. This research utilises definitions primarily from international entities, such as the World Economic Forum (WEF), OECD, CEDEFOP, and International Labour Organization, acknowledging that a comprehensive literature review would necessitate further study.

2.1 Conceptualisation: Skills, Skill Gap, Reskilling, Upskilling, Green Skills and Digital Literacy

Skills refer to the proficiency and competence to execute methods and to apply one's knowledge responsibly to attain a specific objective. They form part of the broader idea of competency, which encompasses values, knowledge, skills, and attitudes (OECD, n.d.).

According to the OECD Learning Compass 2030, skills can be categorised into three main types: cognitive and meta-cognitive skills (including critical thinking, creative thinking, learning-to-learn, and self-regulation), social and emotional skills (encompassing empathy, self-efficacy, responsibility and collaboration) and practical and physical skills (which involve the use of new information and communication technology tools) (OECD, n.d.).

Concomitantly, a skill gap occurs when an individual lacks the necessary level of skills to perform their job effectively. Such gaps may result from an insufficient overall qualification or from a workforce that, despite possessing the appropriate qualifications, lacks certain specific skills (e.g., managerial abilities) or the experience required to carry out a task or role competently (CEDEFOP, 2014a).

Moreover, a skill mismatch occurs when an employee's competencies have diverged with the labour market's requirements. It can be vertical (mismatches referring to higher or lower education levels) or horizontal (mismatches referring to the type of skills that are inappropriate for the job) (CEDEFOP, 2014a).

Mismatches can lead to reduced job satisfaction, earnings, and societal welfare, as well as reduced productivity and human capital investments (OECD 2024). A proper alignment between workers' skills and job demands is crucial for a productive economy. Individually, misalignment can lead to job-to-job dissatisfaction and lower salaries, while at a broader level, it may cause diminished productivity and waste of human capital investment (OECD, 2024).

Reskilling and upskilling are key practices for sustaining competitiveness, allowing individuals to acquire new skills or enhance existing ones to meet evolving job needs. An interrelation between reskilling and upskilling is occasionally made. Nevertheless, they signify two distinct processes. Reskilling entails acquiring new capabilities for a different profession or sector, whereas upskilling involves enhancing existing skills or acquiring new ones (Hasan et al., 2024; Kilag et al., 2024).

Additionally, according to CEDEFOP (2014a), short-term, targeted training provided after initial education and designed to enhance, update, or supplement the knowledge, skills and competencies previously acquired is referred to as upskilling (CEDEFOP, 2014a).

Abiities that individuals possess which are applicable to jobs or occupations beyond their current or most recent role are known as transversal skills. These skills may be acquired through non-work-related or leisure activities, as well as through participation in education or training. More broadly, transversal skills are learned in a single context or developed addressing a specific situation or problem and that can be relocated and applied effectively to other contexts. (European Lifelong Guidance Policy Network, 2014).

The ability to effectively use information and communication technology (ICT) is known as Digital competence or digital literacy. It is reinforced by elementary skills in ICT, including computers usage to archive, display, evaluate, retrieve and disseminate information, as well as to communicate and participate in collaborative networks via the Internet (CEDEFOP, 2014a).

Green skills refer to the competencies required to modify goods, services and procedures in response to environment change and associated ecological mandates and guidelines. They will be needed across all sectors and at every level of the workforce (CEDEFOP, 2014).

Green skills are crucial for enabling the transition to a low-carbon economy. The successful transition to a low-carbon economy necessitates the ability of the labour force to shift from declining employment sectors to emerging industries, alongside the availability of sufficient human capital to cultivate new sectors arising from climate change mitigation and adaptation efforts. Skills development initiatives will significantly influence each of these shifts (CEDEFOP, 2014).

2.2 Competencies Development, Anticipation and Policy Alignment in Europe

The creation of new job opportunities that require new skill profiles and training frameworks, causing structural changes that make some jobs more in demand and others less so, and making existent professions change their job standards, which means current training systems need to be updated are all aspects taken into consideration when transitioning to a greener economy (CEDEFOP, 2014). Additionally, employee productivity, educational level and information-processing co-exist positively correlated (OECD, 2024).

Critical thinking, creativity, collaboration, language skills and problem-solving are all related to transversal skills, whereas knowledge and practices related to circular economy, energy efficiency, energy transition, and environmental sustainability are incorporated in green skills. Entrepreneurial and managerial skills, including the ability to create value, innovate, lead teams, and manage resources in uncertain and changing contexts, are also essential for navigating evolving job requirements and maintaining employability over time (European Commission, 2023).

Unchecked climate change bring repercussions that will consequently impede GDP growth, productivity, and labour conditions. Soil pollution, water, and local air, along with additional arrangements of environmental degradation, have an adverse impact on workers' healthiness, revenue, food and fuel security, and productivity (International Labour Organization, 2018).

CEDEFOP & UNESCO-UNEVOC (2025) report that skills mismatches are a major barrier to the greening of the economy in 21 out of 27 examined nations. An inadequate understanding of the environment-skills connection, a lack of routinely conducted employment forecasts, the absence of financial mechanisms to promote investments in skills development for the green transition, and weak involvement of social partners continue to obstruct the realisation of an effective transition (CEDEFOP & UNESCO-UNEVOC, 2025).

Social partners piece a key part in identifying skills deficiencies, implementing training programs, and recognising employment competencies. However, their involvement in discussions, particularly regarding workers, is limited. Nonetheless, where they are present, specialised bodies have improved training for sectors such as renewable energy and waste management (International Labour Organization, 2018).

The European Commission has communicated a European Skills Agenda, setting out a five-year approach, between 2020 and 2025, structured in the following blocks: strengthening skills intelligence, skills to support digital and green transitions, increasing the number of STEM graduates and promoting entrepreneurial and transversal skills and tools for lifelong learning, such as micro-credentials and Europass (European Commission, 2023).

The future skills combine foundational, technical and transversal skills necessary to respond to digital, green and demographic shifts, such as basic skills in literacy, numeracy, digital skills and citizenship, STEM skills (digital literacy to advanced skills in science, technology, engineering and mathematics), crucial to innovation and sustainability, according to the European Commission (2023).

The advancement and integration of artificial intelligence (AI) are expected to significantly influence labour markets, affecting employment rates and job quality, as well as the organisation of work, the kind of activities performed by workers, and the requisite skills. To adjust to fast changes, such as skill makeup of employment and the allocation of occupations within the economy, adult education systems must adjust swiftly (OECD, 2023).

The necessity of possessing fundamental digital skills to engage with AI may restrict participation among individuals with lower skill levels. At the same time, the propensity of certain algorithms to amplify human biases may diminish inclusivity. The integration of AI in training is expected to alter the skill requirements for educators and trainers significantly. These topics require meticulous consideration (OECD, 2023).

The demand for advanced skills will arise from the necessity to design and manage AI systems, as well as from the utilisation and interaction with AI applications. Positions focused on the development and maintenance of AI systems are predominantly technical, with certain roles being novel, as they entail activities unique to AI that are not found in current professions (OECD, 2023).

2.3 Bridging Skill Gaps: Learning Strategies and Labour Market Needs

According to the 2023 Survey of Adult Skills, the likelihood of employment is positively correlated with both education and skills (OECD, 2024). This strong correlation suggests that individuals with higher skills are more likely to secure employment, and their simultaneous work experience offers additional opportunities for skill improvement (OECD, 2024). This report indicated that, on average, proficiency in skills considerably influences both well-being and civic involvement. Nonetheless, the intensity and character of this link differ among nations (OECD, 2024).

Lower-skilled persons are less likely to secure full-time employment than their highly skilled counterparts. On average, 91% of high-skilled workers in OECD countries are employed full-time, compared to 82% of low-skilled workers (OECD, 2024). Czechia and Poland stand out as exceptions, with a higher share of low-skilled workers employed full-time.

By contrast, the Netherlands has the lowest overall rate of full-time employment, primarily due to 34% of its low-skilled workforce working part-time, the highest proportion among participating countries (OECD, 2024).

Policies and programs regarding skills for the green transition typically employ a sectoral approach. Interventions in renewable energy and energy efficiency skills have been executed in accordance with the legal stipulations for vocational certification and training established in the legislation. They emphasise the significance of the regulatory framework in incorporating environmental and equitable labour results (CEDEFOP & UNESCO-UNEVOC, 2025).

Additionally, legal norms can facilitate progress toward equitable employment during and after the transition to environmental sustainability (International Labour Organization, 2018). Public policies are crucial in fostering enhanced training opportunities provided by companies, ensuring a cohesive strategy for skills development in AI throughout its lifecycle, from early education to lifelong learning, and promoting diversity within the AI workforce (OECD, 2023).

While skills development programs for firms and people aid the transition to a green economy, they have not yet been integrated into policy considerations. Attaining a just transition is greatly enabled by skills development courses. According to the International Labour Organization (2018), amongst the 27 studied nations, almost two-thirds have developed platforms to forecast skills requirements and training provisions; however, these platforms are not universally utilised to address the skills ramifications of the green transition.

Portugal's Qualification Needs Anticipation System (SANQ) constitutes the foundation of the skills anticipation strategy. It is a diagnostic instrument that employs systematic procedures, various quantitative and qualitative approaches, and a synthesis of diagnosis, forecasting, and planning to determine qualification requirements at both national and regional levels (CEDEFOP, 2023b).

SANQ is managed by ANQEP, a governmental body overseen collaboratively by the Ministry of Education, the Ministry of Labour, Solidarity and Social Security and the Ministry of Economy and Maritime Affairs (CEDEFOP, 2023b).

Even so, around 14% of Portuguese workforces report being overqualified (OECD average: 23%), and another 14% report being underqualified (OECD average: 9%), i.e. they consider their academic qualifications to be overhead or underneath the level stereotypically required for their existing job (OECD, 2024).

Moreover, workers (around 7%) state that some of their skills fall short of what remains required for their careers (OECD average: 10%). Portugal's labour force frequently cite the necessity to enhance their computer or software competencies (35%), suceeded by their organisational or project management skills (32%) (OECD, 2024).

The 2015 OECD Skills Strategy Diagnostic Report outlines the main goal of the collaborative initiative between the OECD and the Portuguese government: to develop an effective Skills Strategy for Portugal. This strategy aims to provide a strategic assessment of the national skills framework and the mechanisms for cultivating, mobilising, and utilising skills. A thorough understanding of these issues is crucial for devising effective policies and strategies that meet Portugal's future skill needs and enhance the alignment between skill supply and demand (CEDEFOP, 2023b; OECD, 2015).

3. Methodology

This study employs an exploratory and comparative research design, utilising secondary data through descriptive content analysis of international reports. The analysis considers skills development, labour market forecasts, and global skilling trends.

The field of future-oriented skills in relation to reskilling and upskilling in Portugal amidst digital and green transformation is still emerging. Therefore, an exploratory approach enables the identification of patterns, gaps, and potential misalignments without imposing a rigid hypothesis that may overlook the complexity of the topic.

Secondary data is initially collected for purposes other than the current research, often by organisations, institutions, or other researchers, and is later reanalysed for new objectives (Greener, 2008; Saunders et al., 2016, 2019).

Unlike primary data, which is collected directly by the researcher, secondary data can be documentary, survey-based, or derived from multiple sources. Documentary secondary data, in particular, can be rearranged across time and space, allowing for reuse in different contexts (Saunders, Lewis, and Thornhill, 2019).

The secondary analysis primarily utilises information from reputable sources, including the OECD, the ILO, UNESCO, the WEF, the European Commission, and the European Council.

In the following chapter, *"Results and Discussion," the top 5 skills are presented as identified in reports by the World Economic Forum (2025), CEDEFOP (2015, 2023d),* and the OECD (2024). The accompanying definitions reproduce the official formulations provided in these sources rather than interpretations by the present authors. Accordingly, all secondary data reported here is drawn directly from external publications, with the corresponding references indicated alongside each definition.

4. Results and Discussion

Skills enable adults to perform their work more effectively, thereby enhancing employability and increasing earning potential. The relationship between skills, productivity and income is well established in economic theory and supported by empirical evidence (OECD, 2024).

According to the WEF (2025), the top five skills are identified as analytical thinking, resilience, flexibility and agility, leadership and social influence, creative thinking, and motivation and self-awareness. At the same time, major drivers of skills disruption are highlighted, including technological change, geoeconomic fragmentation, economic uncertainty, demographic shifts, and the green transition (World Economic Forum, 2025).

The following table presents definitions drawn directly from recognised international organisations, reflecting the concepts as set out in the Future of Jobs report by the World Economic Forum.

Table 1: Top 5 skills

Future Skill	Definition
Analytical thinking/ Critical Thinking	Critical thinking involves the mental processes and strategies used to solve problems, make decisions and learn. It is a higher-order cognitive skill that encompasses reasoning, analysis, inference and evaluation. Although definitions vary, most agree that critical thinking is intentional, goal-directed thinking.
Resilience	Resilience involves enduring focus on challenging tasks for long-term goals, linked to conscientiousness and grit. Persistence and resilience are defined as the disposition to maintain effort and interest despite obstacles.

Future Skill	Definition
Flexibility and agility	Cognitive flexibility is the capacity to shift perspectives, reframe problems and adapt to changing demands or priorities. It involves seeing issues from different viewpoints, adjusting strategies when needed and recognising mistakes while seizing unexpected opportunities. It is the ability to adapt one's behaviour appropriately to a changing environment.
Leadership and social influence	The set of characteristics that make a good leader; the position or fact of being the leader; and the person or people in charge of an organisation (Dictionary of Cambridge 2025).
Creative thinking	Creative thinking is the process of generative innovative ideas, methods or insights. Creativity is intrinsically linked to innovation. It involves individual focused creation of beneficial concepts, while innovation involves team of organisational focused introduction and execution of ideas.
Motivation	Motivation refers to the inner states that drive the pursuit of knowledge, skills, goals, values, and actions. It is commonly divided into intrinsic and extrinsic forms. Intrinsic motivation stems from personal values, identity, or growth, while extrinsic motivation arises from external rewards or reinforcement, such as praise or money.
Self-awareness	Self-awareness is the ability to understand one's emotional state, recognise personal strengths and limitations, and identify preferences. It includes emotional awareness, accurate self-assessment, and recognition of behavioural tendencies.

Source: Table developed by the authors, based on World Economic Forum (2025) and OECD (n.d.).

In the Portuguese context, the evidence points to a similar set of priorities in skills. The most frequently identified and pressing skills areas to be strengthened include digital and technological literacy, analytical and problem-solving skills, lifelong learning and adaptability, strong foundation skills such as literacy and numeracy, and sector-specific capabilities to address shortages in areas such as ICT and health (CEDEFOP 2015, 2023, DGERT 2019, Ferreira 2016).

Table 2: Top 5 Skills in demand in Portugal

Skills in Demand (PT)	Definition	References
Digital and technological skills	Digital technology and technical skills emphasise the comprehension, use, and creation of digital systems and technologies effectively and responsibly. This area encompasses technical skills such as programming and data analysis, as well as proficiency in digital platforms (like Zoom or Instagram), and the ethical use of digital technology.	(World Economic Forum, 2025) and (University of Cambridge, 2025)
Analytical thinking/ Critical Thinking	Critical thinking involves the mental processes and strategies used to solve problems, make decisions and learn. It is a higher-order cognitive skill that encompasses reasoning, analysis, inference and evaluation. Although definitions vary, most agree that critical thinking is intentional, goal-directed thinking.	(World Economic Forum, 2025) and (OECD, n.d.)
Lifelong learning/adaptability and flexibility	All educational endeavours pursued throughout life that enhance knowledge, expertise, skills, competencies, and/or qualifications for personal, social, and/or professional purposes.	(World Economic Forum, 2025) and (European Lifelong Guidance Policy Network, 2014)
Foundation skills: literacy and numeracy	Fundamental skills include literacy, numeracy, and social-emotional competencies. The essential abilities cultivated from early childhood to secondary education are crucial for academic achievement and lifelong learning. Foundational literacy encompasses the skills of hearing and speaking with comprehension, as well as the capacity to read and comprehend elementary texts. Foundational numeracy encompasses understanding of number sense, proficiency in counting, fundamental operations, and mathematical reasoning.	(UNESCO, 2025), (UNICEF et al., n.d.) and (World Economic Forum, 2025)
Leadership/social influence/soft skills	The set of characteristics that make a good leader; the position or fact of being the leader; and the person or people in charge of an organisation.	(University of Cambridge, 2025) and (World Economic Forum, 2025)

Source: Table developed by the authors, based on CEDEFOP (2023, 2015).

The skills priorities in Portugal broadly align with Europe's future-oriented agenda, yet a gap persists between emergind digital and green skills and those prevailing in the workforce. This misalignment, specifically in advanced cognitive and technological competencies may hinder innovation, slow technologiy adoption and constrain Portugal's long-term labour productivity and competitiveness. Therefore, skills significantly impact income, job opportunities and well-being (Tables 1 and 2).

Lower literacy proficiency is correlated with poorer health, political apathy, and reduced trust in others. Strengthening the link between education and employment is essential for vocational education programs to lower dropout rates (CEDEFOP, 2023b). Portugal is enhancing its vocational education system through a strategy that focuses on improving qualifications for both youth and adults, alongside ongoing investment in reskilling and upskilling (Tables 1 and 2, CEDEFOP, 2023b).

By 2030, according to current forecasts, new job growth and job displacement resulting from macrotrends will constitute a combined total of 22% of the existing formal employment. A generation of new jobs driven by macro trends is projected to reach 170 million, or 14% of the current total employment.

This expansion is anticipated to be counterbalanced by the displacement of 92 million existing jobs (representing 8% of total employment), culminating in a net increase of 78 million jobs (or 7% of current total employment) (World Economic Forum 2025).

The demand for skills is evolving due to several trends, including technological advancement, such as higher internet access, developments in artificial intelligence (AI), demographic shifts and information processing, as well as robotics and autonomous systems technologies, which are trends that substantially drive the fastest growing and declining jobs (World Economic Forum 2025, OECD 2018).

The future workforce requires a balance between technological proficiency and human capital, with digital competencies (including data analysis, programming and digital literacy) and advanced cognitive skills (such as problem-solving, critical thinking and active learning) becoming increasingly vital for navigating complex tasks in an era of automation. Nonetheless, socio-emotional skills such as cooperation, communication, adaptability, and resilience are essential for collaboration and leadership in heterogeneous and rapidly evolving work environments.

Furthermore, management and innovation skills, including project management, creativity, and leadership, are key for guiding organisational change, driving transformation, and sustaining competitiveness in knowledge-driven economies. Taken together, these skills embody the competencies that are most likely to influence employability and productivity (CEDEFOP & UNESCO-UNEVOC, 2025; World Economic Forum, 2025).

5. Concluding Remarks

Equipping the Portuguese workforce for the future requires the successful formulation of reskilling and upskilling programs, along with holistic and comprehensive methods to evaluate their effectiveness. Additionally, the efficacy of these programs is crucial to ensure that training investments yield tangible benefits in terms of employability and productivity.

The ongoing monitoring of the alignment between skills and the increasing demands of industries is equally important, as labour market transformations are rapidly advancing due to digital transformation, automation and sustainability transitions.

Furthermore, governments, organisations, and individuals must engage in thorough assessments and continuous improvement to ensure that lifelong learning systems remain responsive, inclusive, and resilient against future challenges in the labour market.

6. Future Implications/Considerations

This study highlights the centrality of skills to employability, productivity and income, underscoring their importance for both individuals, organisations and public policies. Based on information gathered from international organisations such as the OECD, the World Economic Forum, and the International Labour Organization, it was demonstrated that the importance of analytical, emotional, and adaptive skills is crucial, as is the urgency of preparing workforces for disruptive trends, including technological change, demographic shifts, and the green transition. The Portuguese context mirrors these global trends, with pressing needs identified in

digital literacy, problem-solving, lifelong learning, and sector-specific skills (World Economic Forum, 2025; OECD, 2024).

Henceforward, policy and practice must respond proactively to evolving labour market demands. Addressing skill gaps, needs, and shortages requires coordinated efforts in strategies across education, training, and employment systems, while tackling underqualification, undereducation, and underskilling. This involves proposing tailored interventions that depend on different needs. The integration of green skills into vocational and lifelong learning programmes is critical, as it aligns with sustainability and climate goals (OECD, 2018; CEDEFOP, 2014b; REGULATION (EU) 2021/1119, European Climate Law, 2021; European Council, 2025; European Commission, 2019).

Declaration of Ethics

This study is based exclusively on the analysis of secondary data obtained from publicly available reports and publications by international organisations. As no primary data was collected from individuals, ethical clearance was not required.

Declaration of AI

Artificial intelligence tools were employed to support language editing of the manuscript. All interpretations, analyses, and selections of information remain the responsibility of the authors.

References

Bryman, A. (2012) *Social Research Methods*, 4th Ed, Oxford University Press, Oxford University Press.

CEDEFOP (2023) *Skills Anticipation in Portugal (2023 Update)*.

CEDEFOP (2015) *2025 Skills Forecast - Portugal*.

CEDEFOP (2014a) *Terminology of European Education and Training Policy Terminology of European Education and Training Policy - A Selection of 130 Key Terms* [online], Luxembourg, available from http://europass.cedefop.europa.eu.

CEDEFOP (2014b) *OECD Green Growth Studies: Greener Skills and Jobs* [online] OECD Green Growth Studies, OECD, available from https://www.oecd.org/en/publications/greener-skills-and-jobs_9789264208704-en.html.

CEDEFOP & UNESCO-UNEVOC (2025) *Meeting Skill Needs for the Green Transition, Skills Anticipation and VET for a Greener Future* [online], Luxembourg, available from http://data.europa.eu/doi/10.2801/6833866.

DGERT (2019) *Vocational Education and Training in Europe Portugal 2018*.

Dictionary of Cambridge (2025) *Concept of Leadership*.

European Commission (2023) *European Skills Agenda*, [Publications Office of the European Union].

European Commission (2019) *The European Green Deal* [online] Brussels, available from https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF.

European Council (2025) *Fit for 55*.

European Lifelong Guidance Policy Network (2014) *Lifelong Guidance Policy Development: Glossary* [online], Jyväskylä, available from http://elgpn.eu.

Ferreira, F. (2016) *Key Competences in Vocational Education and Training - Portugal*.

Greener, Sue. (2008) *Business Research Methods*. BookBoon

Hasan, M., Haque, Md.A., Nishat, S.S., and Hossain, Md.M. (2024) 'Upskilling and Reskilling in a Rapidly Changing Job Market: Strategies for Organisations to Maintain Workforce Agility and Adaptability', *European Journal of Business and Management Research* [online], 9 (6), 118–126, available from https://www.ejbmr.org/index.php/ejbmr/article/view/2502.

International Labour Organization (2018) *World Employment Social Outlook 2018 - Greening with Jobs* [online], Geneva, available from www.ilo.org/publns..

Johnston, M.P. (2014) 'Secondary Data Analysis: A Method of Which the Time Has Come', *Qualitative and Quantitative Methods in Libraries (QQML)* 3, 619–626.

Kilag, O.K.T., Padilla, K.S., Yorong, F.S., and Merabedes, J.G.A. (2024) 'Importance of Upskilling and Reskilling in Educational Leadership and Management', *European Journal of Learning on History and Social Sciences* [online] 1 (1), available from https://journal.silkroad-science.com/index.php/EJLHSS|49.

OCED (2024) *Inquérito Às Competências Dos Adultos de 2023*.

OECD (2024) *Do Adults Have the Skills They Need to Thrive in a Changing World? Sruvey of Adult Skills 2023* [online] OECD Skills Studies, Paris: OECD, available from https://www.oecd.org/en/publications/do-adults-have-the-skills-they-need-to-thrive-in-a-changing-world_b263dc5d-en.html.

OECD (2023) *OECD Employment Outlook 2023 - Artificial Intelligence and the Labour Market* [online], OECD Employment Outlook, OECD, available from https://www.oecd.org/en/publications/oecd-employment-outlook-2023_08785bba-en.html.

OECD (2018) *Skills for Jobs* [online], available from www.oecdskillsforjobsdatabase.org.

OECD (2015) *OECD Skills Strategy Diagnostic Report*.
OECD (n.d.) *OECD Learning Compass 2030-Glossary*.
REGULATION (EU) 2021/1119 European Climate Law, 2021, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1119&from=EN.
Saunders, M., Lewis, P., and Thornhill, A. (2016) *Research Methods for Business Students (7th Ed.), Harlow Pear*, 9th edn, Pearson.
Saunders, M., Lewis, P., and Thornhill, A.K. (2019) *Research Methods for Business Students* [online] 8th edn. Ed, Pearson, available from www.pearson.com/uk.
UNESCO (2025) *Foundational Learning*.
UNICEF, J-PAL, Pratham, and Delivery Associates (n.d.) *Assessing Foundational Literacy and Numeracy*.
University of Cambridge (2025) *Digital Technology & Technical Skills*.
World Economic Forum (2025) *The Future of Jobs Report 2025* [online], available from www.weforum.org.