



From Soft Skills to Green Skills: Redefining Employability in the Age of Sustainability

Pınar Sarp Hüseyin ¹

Abstract: *This qualitative study examines the strategic role of green skills in the sustainability transformation of organisations. Based on in-depth interviews, the research reveals the views of different employees regarding green skills, examining how these competencies are integrated into organisational structures. By adopting a workforce perspective, the study highlights how green skills are developed in practice within professional environments and why they are becoming increasingly necessary. The findings show that green skills have evolved from basic environmental awareness into strategic capabilities that support organisational competitiveness and resilience. The analysis identifies six core themes: forecasting future skill disruptions, technical and solution-oriented skill demands, green skills as a tool for adaptation and transformation, integration into human resources strategy, social implications, and sustainability data analytics and information presentation. These themes provide a framework for understanding how green skills are interpreted and applied across organisational contexts. The study further indicates that green skills should be more systematically integrated into job design, training, and performance evaluation processes, supporting organisational workforce adaptation to sustainability-oriented models. In conclusion, the research demonstrates that green skills are not merely an environmental requirement but a key component of workforce strategies and the broader sustainability transformation.*

Keywords: Green Skills, Sustainability Transformation, Workforce Adaptation

JEL: Q56, J24

Received : 21 January 2026

Revised : 26 March 2026

Accepted : 11 April 2026

Type : Research

1. Introduction

Increasing regulatory pressures, net-zero commitments, and stakeholder expectations have rapidly increased demand for sustainability and ESG professionals (Michael Page, 2025). As sustainability becomes a strategic priority, organisations require skills in areas such as environmental management, reporting, and data analytics, making workforce transformation a critical challenge for organisations, labour markets, and education systems.

Despite this expansion, policy and academic debates continue to frame green skills predominantly in terms of science, technology, engineering, and mathematics oriented technical competencies. Existing analyses emphasise capabilities such as renewable energy technologies, resource management, and risk assessment, while social, managerial, and behavioural competencies remain comparatively underexplored (Kwauk, 2021). However, the success of the sustainability transition depends not only on technical expertise

Cite this article as: Sarp Hüseyin, P. (2026). From soft skills to green skills: Redefining employability in the age of sustainability. *Business and Economics Research Journal*, 17(2), 329-346. <http://dx.doi.org/10.20409/berj.2026.500>

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¹ Asst. Prof., PhD., Istanbul Kültür University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Istanbul, Türkiye, p.sarp@iku.edu.tr

but also on transversal skills—such as communication, leadership, systems thinking, and innovation—that enable organisations to adapt and transform in response to environmental change (ILO, 2019; OECD, 2023).

Although research on green skills has expanded, a clear framework explaining their interpretation and implementation in organisational contexts remains lacking. While prior studies focus on classification, limited attention has been given to how these skills are translated into practices such as job design, training, and performance management (Cabral & Dhar, 2020; European Commission, 2022).

Addressing this theoretical and empirical gap, the present study aims to examine green skills from the perspectives of employees working in different roles across private-sector industries. Rather than analysing public institutions or higher education systems, the study focuses on how employees perceive green skills, translate them into organisational practices, and relate them to education systems and public policies within the private-sector context. By focusing on the perspectives of employees in the private sector, this approach provides an understanding of how green skills are used at the organisational level and how they relate to employability, workforce development, and organisational transformation. The sample includes employees from functions such as human resources, finance, production, IT (information technologies), marketing, and procurement, reflecting the study's exploratory focus on how green skills are embedded across organisational contexts.

To theoretically integrate these dimensions, the analysis draws on “dynamic capabilities theory”, which conceptualises adaptation as sensing change, seizing opportunities, and transforming organisational processes (Teece et al., 1997). From this perspective, green skills are viewed as dynamic organisational competencies that support learning, innovation, and sustainable competitive advantage.

Methodologically, this study adopts a qualitative research design based on semi-structured interviews conducted with employees in the private sector. The findings indicate that green skills are a key component of employability and a driver of a resilient, future-oriented workforce.

In summary, this study makes two key original contributions. Theoretically, it brings together green skills, employability, and sustainability transition within the framework of dynamic capabilities theory, filling a conceptual void by enabling a reconceptualisation of green skills as organisational capabilities rather than solely individual competencies, thereby linking individual competencies to organisational transformation. Empirically, it provides original insights into how private-sector employees across diverse organisational functions interpret and operationalise green skills in practice, thus addressing both conceptual and empirical gaps by demonstrating how 'green' talent drives organizational resilience in the face of the sustainability transition.

The remainder of the article is structured as follows: Section 2 presents the theoretical foundations of green skills. Section 3 outlines the research methodology. Section 4 reports the empirical findings of the study. Section 5 discusses these findings in relation to the existing literature and theoretical framework. Finally, section 6 concludes the study by summarising the main results.

2. Theoretical Background

2.1. Previous Research and Research Gap

Green skills have been examined from multiple perspectives in the literature, including labour market dynamics, sustainability transformation, and organisational practices. Existing studies focus on issues such as the mismatch between educational outcomes and industry needs, the role of green skills in environmental adaptation, and their impact on economic transformation and employment structures (Fuchs, 2023; Vona et al., 2018). However, recent research suggests that green skills are not limited to technical competencies but should be understood as a multi-level set of competences encompassing different dimensions (Wegenberger & Ponocny, 2025).

A significant stream of literature focuses on the role of green skills within education and employment systems. These studies examine the integration of green skills into curricula, teaching processes, and

sustainable career development, while also highlighting their connection to increasing labour market demand and sectoral transformation (Albertz & Pilz, 2025; Kamis et al., 2017; Sern et al., 2018).

In parallel, sector- and industry-oriented research demonstrates that green skills play a critical role in industrial transformation, particularly in the context of sustainable manufacturing processes (Lagorio et al., 2024). At the organisational level, studies have explored how green skills are developed within workplaces and how they support sustainable economic transition. (Mardikaningsih & Hariani, 2025; Napathorn, 2022).

Despite these contributions, the literature remains fragmented and is predominantly centred on macro- and meso-level perspectives. Limited attention has been given to how green skills are interpreted within organisations and how they are enacted in everyday work practices across different organisational functions. In particular, the interaction between green skills and established competencies—such as communication, problem-solving, and leadership—and how these competencies are transformed within sustainability processes remains underexplored.

Accordingly, this study addresses this gap by examining green skills from the perspectives of employees working across different organisational functions in the private sector. Unlike prior studies, this research does not treat green skills solely as predefined competency sets; rather, it focuses on how these skills are interpreted, enacted, and integrated into organisational processes in everyday work practices. In doing so, the study offers a micro-level, practice-oriented, and employee-centred perspective, thereby providing an original contribution to the literature.

2.2. The Conceptual Framework of Green Skills

The definition of “green skills” remains highly debated in the literature, with no clear consensus on its scope and boundaries. Although skills play a central role in the labour market, they are often treated as latent attributes that cannot be directly measured and are instead inferred through indicators such as cognitive abilities, knowledge types, educational attainment, and learning duration.

Clarifying the concepts of green skills and sustainability competences is therefore essential, particularly in the context of a rapidly transforming world of work that requires new capabilities across both emerging and existing occupations. As skills constitute a fundamental factor in achieving a sustainable economy (Strachan et al., 2023), a clear conceptualisation is necessary to prevent potential skill gaps and support effective policy and educational design.

Existing definitions converge around a multidimensional understanding of green skills. The Platform for Advancing Green Human Capital (2017) defines them as the knowledge, abilities, values, and attitudes required for the transition to a green economy, while Martinez-Fernandez et al. (2014) emphasise their role in enabling workers across sectors to adapt products, services, and processes to environmental and climate-related requirements. Similarly, CEDEFOP (2013) highlights their cognitive, behavioural, and value-based components.

These perspectives underscore the need for a comprehensive understanding of green skills at both individual and systemic levels. Preparing individuals for an increasingly “green” world of work requires not only the identification of relevant competencies but also a shared understanding that can guide workforce development, education systems, and policy frameworks (Montanari et al., 2023).

2.3. The Transforming Function of Skills: Technical and Socio-Behavioural Competencies in the Green Transition

Developing and industrialising economies can draw key lessons from the role of skills in responding to environmental change. As climate impacts reshape production and labour markets, adapting both technical and socio-behavioural competencies becomes essential. While technical expertise (e.g., energy efficiency and emissions reduction) remains important, social skills such as collaboration, communication, and adaptability are equally critical.

Evidence suggests that the green transition requires the combined development of technical, managerial, and social skills (OECD & CEDEFOP, 2014). As shown in Tables 1 and 2, this shift depends not only on technical expertise but also on competencies related to strategic planning and social awareness.

Table 1. The Technical, Managerial, and Behavioral Dimensions of Green Skills

Skill Category	Example Competencies	Role in the Green Transition
Technical Skills	Efficiency, Waste Management, Low-Carbon Technologies	Enhances environmental performance and optimises resource use
Managerial Skills	Project Management, Sustainable Strategies, Regulatory Compliance, ESG Reporting	Facilitates the implementation of corporate sustainability policies
Social and Behavioral Skills	Environmental Awareness, Communication, Leadership, Teamwork, Innovation	Supports behavioural change and cultural transformation

Note: Table 1 has been adapted by the author based on the skill themes presented in the “Skills for a Greener Future: A Global View” report by the International Labour Organization (ILO, 2019).

Table 2. Core Skills Required for Green Jobs by Occupational Level

Skills Required for the Entire Workforce	Skills Required in Medium- and High-Skilled Occupations
Environmental awareness and protection; willingness and ability to learn about sustainable development	Ability to analyse the need for change and identify necessary measures (including risk and systems analysis)
Abilities to learn, apply, and adapt new technologies to make work processes more environmentally friendly	Interdisciplinary management and coordination skills that integrate economic, social, and ecological objectives
Teamwork skills aimed at collectively managing the environmental impacts of organisations	Strategic development and innovation skills to address green challenges
Commitment to sustaining change processes	Skills for developing and marketing more environmentally friendly products and services
Communication and negotiation skills that promote the green transition among employees and customers	Skills in providing consultancy on green solutions and promoting the use of environmentally friendly technologies
Entrepreneurial capacity to identify and leverage opportunities in low-carbon technologies and environmental compliance	Networking, digital literacy, and knowledge-sharing skills that enhance effectiveness in global markets
Occupational Health and Safety awareness	Strategic leadership and policy development skills; capacity to create incentives for clean production and sustainable transport conditions

Note: Table 2. has been adapted by the author based on the skill themes presented in the “Skills for a Greener Future: A Global View” report by the International Labour Organization (ILO, 2019).

Demand for green skills is rapidly increasing across sectors, particularly in areas such as carbon accounting, emissions trading, and sustainability reporting. This trend highlights that the green transition requires a broad transformation of skills beyond technical domains, including finance, governance, and policymaking. However, supply has not kept pace, creating a growing gap between employer demand and

workforce capabilities. LinkedIn (2023) reports that while the share of employees with green skills rose by 12% between 2022 and 2023, job postings increased by over 22%, indicating a likely shortage. This suggests that the success of the green transition depends not only on technological progress but also on the availability of a qualified workforce and effective skills policies.

2.4. Stakeholder Roles in Green Skills Development

2.4.1. Governments

Governments play a central role in steering the green transition by ensuring policy coherence across energy, industry, employment, and education systems. Given its multidimensional nature, effective governance requires aligning education, labour market, and environmental policies to support green skills development and workforce adaptation (ETF, 2023; OECD, 2025). In addition to regulatory frameworks, governments contribute through national strategies, stakeholder coordination, and industry–education collaboration (Busemeyer, 2025).

Fiscal and financial instruments also support this process by reducing investment risks and promoting upskilling and reskilling through targeted incentives (ETF, 2023). Moreover, investments in green R&D and skills monitoring systems are essential to align education and training with evolving labour market needs. However, these efforts remain constrained by institutional fragmentation, limited coordination, and financial, technological, and socio-political barriers (EU, 2024). Addressing these challenges requires a more integrated governance approach aligned with the objectives of the European Green Deal.

2.4.2. Universities

Universities play a critical role in the green transition by aligning education, research, and institutional strategies with emerging green skill needs. This requires restructuring education systems—across vocational, higher, and lifelong learning—through curriculum design, teaching methods, and stronger industry collaboration (Paeradigms, 2024). However, opportunities to develop green skills remain uneven, highlighting the need to embed sustainability competencies more systematically and strengthen experiential learning (da Costa et al., 2025).

Frameworks such as the European Green Deal’s Skills Agenda and GreenComp support alignment with labour market needs and the integration of sustainability across disciplines (EU, 2021; EU, 2022). Beyond teaching, universities also contribute by creating supportive ecosystems through certification programmes, training, and mentorship. Nevertheless, institutional inertia, cultural resistance, and limited pedagogical capacity continue to constrain progress, underscoring the need for strategic leadership and long-term commitment (ETF, 2023; EU, 2024).

2.4.3. Businesses

In the green transition, businesses must move beyond compliance-based practices and invest in human capital to remain competitive. This involves targeted upskilling and reskilling in areas such as green technologies, sustainable production, and energy efficiency (ILO, 2019), strengthening adaptive capacity and supporting long-term transformation. At the same time, the transition has a strong social dimension, requiring inclusive workforce participation; by promoting access to green jobs for women, youth, and disadvantaged groups, firms can support social justice while fostering a human-centred organisational culture (Kwauk & Casey, 2022).

Human resource management serves as a key mechanism for diffusing green skills across organisations. Integrating sustainability-related competencies into recruitment, training, performance evaluation, and career development embeds environmental awareness into organisational practices (ILO, 2019). In this way, HRM shifts from a supportive role to a strategic actor in implementing sustainability objectives.

At the strategic level, the impact of green skills depends on their integration into corporate strategy. Embedding sustainability objectives into strategic plans, performance indicators, and value systems ensures alignment with environmental goals. Incorporating green skills development into ESG reporting also enhances transparency and stakeholder trust, strengthening long-term competitiveness (ILO, 2019).

2.4.4. Collaborative Framework for Green Skills

The success of the green transition depends not only on technological innovation but also on collaboration among universities, industry, and public institutions. The development of green skills requires shared responsibility and coordination across education, employment, and technology policies (Cook & Elliott, 2025). Within this framework, open innovation supports the co-creation of sustainable solutions through knowledge exchange among academia, industry, government, and society, with universities generating knowledge, firms commercialising it, and governments enabling scale through policy and funding (Paeradigms, 2024).

This collaborative structure extends beyond knowledge exchange to include workforce transformation. The greening of jobs requires skills in areas such as energy efficiency, waste management, carbon reduction, and sustainable production, highlighting the importance of upskilling and sustainability-oriented HR practices (ILO, 2019).

University–industry partnerships—such as living labs, industrial PhD programmes, and joint R&D initiatives—help align green skills with labour market needs, while reskilling becomes essential as employment declines in carbon-intensive sectors (Farao et al., 2023). Triple Helix models further strengthen collaboration among universities, industry, and government, supporting innovation diffusion and institutional capacity building (OECD & CEDEFOP, 2014; SOLAS, 2024).

3. Methodology

3.1. Sample

In qualitative research, the primary aim is not to achieve statistical generalisation but to develop an in-depth and contextually grounded understanding of the phenomenon under investigation. Accordingly, the sample size was determined based on the principle of data saturation, a fundamental standard in qualitative research. As the interview process progressed, recurring themes and patterns emerged, and no additional conceptual insights contributing to the existing theoretical framework were identified. Saturation was observed particularly after the twelfth interview, with subsequent interviews confirming rather than extending the existing thematic structure. At this point, data collection was concluded, and the sample was limited to 14 participants.

In constructing the sample, particular emphasis was placed on sectoral and functional diversity. Participants were drawn from multiple sectors, including energy, banking, technology, and textiles, as well as from various organisational functions such as human resources, finance, information technology, and production. This diversity was intentionally designed to align with the research objective of understanding how green skills are interpreted and operationalised across different organisational contexts, rather than within a single functional or sectoral setting. This diversity enabled the study to capture how green skills are not confined to a single organisational unit but are instead embedded across different organisational domains. Table 3 shows the characteristics of the participants.

Table 3. Sample Characteristics

Number of Participants	Gender	Sector	Positions	Department
P1	Female	Energy	Human Resources Specialist	Human Resources
P2	Female	Bank	Assistant Human Resources Specialist	Human Resources
P3	Female	Energy	Finance Specialist	Finance
P4	Male	Technology	IT Specialist	Information
P5	Female	Health	Assistant Production Specialist	Production
P6	Male	Bank	Human Resources Specialist	Human Resources
P7	Male	Food	Marketing Specialist	Marketing
P8	Female	Energy	Accounting Specialist	Accounting
P9	Male	Textile	Production Specialist	Production
P10	Male	Energy	Finance Manager	Finance
P11	Male	Textile	Accounting Specialist	Accounting
P12	Female	Education	Human Resources Specialist	Human Resources
P13	Male	Logistics	Engineer	Production
P14	Male	Construction	Purchasing Specialist	Purchasing

Data were collected through semi-structured interviews. The interview questions were developed based on literature on green skills, sustainability, and employment. Accordingly, open-ended questions focused on five areas: (1) participants' definitions and perceptions of green skills, (2) the reflection of sustainability in recruitment and training processes, (3) the development of employees' green skills, (4) the transformation of traditional soft skills in the context of the green transition, and (5) the skills expected to become more critical for a sustainable workforce. These questions guided the analysis of how green skills are defined, implemented, and positioned within organisational contexts.

Interviews were conducted online between 5 December 2025 and 2 January 2026, each lasting approximately 30–45 minutes. Informed consent was obtained from all participants; however, no audio or video recordings were made, and detailed notes were taken instead. Ethical approval was secured, participation was voluntary, and all data were anonymised using participant codes (P1–P14). As participants shared their views in a personal capacity, no additional institutional permission was required. The full list of interview questions is provided in Appendix A1.

3.2. Data Analysis

The interview data were analysed using thematic analysis, a widely used method in qualitative research. The process was conducted in stages, including coding, the development of sub-themes, and the construction of broader categories to ensure a coherent and systematic interpretation of the data.

The data analysis was conducted in two stages. First, interview notes were reviewed and coded using open coding, with labels assigned to expressions related to green skills and sustainability practices. Coding was done manually with support from Excel. In the second stage, codes were grouped into sub-themes and synthesised into broader themes in line with the research objectives and theoretical framework.

As the interviews were conducted without audio or video recordings, the researcher took detailed notes during each interview. These notes were reviewed and organised after each session and subsequently prepared for analysis and transferred into the coding process. Themes were developed progressively from the data and refined through the review of recurring codes. Data saturation was assessed as the interviews progressed, and it was observed that no new themes emerged in the later stages, with similar patterns recurring across participants. No second coder was involved in the study. Nevertheless, the analysis was conducted in a systematic manner, consistency between codes and themes was ensured, and the findings were supported by direct quotations from participants.

To enhance the transparency and traceability of the analytical process, an example of the coding structure is presented in Table 4. The table illustrates how participant statements were transformed into initial codes, how these codes were grouped under sub-themes, and how they were ultimately synthesised into overarching themes.

Table 4. Example of Coding Process

Participant Statement	Initial Code	Sub-theme	Main Theme
Expectations related to green skills should be incorporated into job descriptions, and green responsibilities should be clearly defined. (P10)	Green skills in job descriptions	Formal Recruitment Criteria	Integration into Human Resources Strategy
Preferring candidates with environmental awareness in recruitment processes is important. (P12)	Environment-oriented recruitment		
Giving priority to candidates who hold sustainability-related certifications, as they demonstrate genuine interest in the topic, may be a good approach.(P12)	Integration of green skills into recruitment		
Every company should have sustainability departments, yet these units still do not receive the attention they deserve. (P1)	Lack of institutional support	Green Career Paths and Compensation Management	
These career paths are not attractive due to insufficient investment and compensation. (P8)	Lack of motivation in green careers		
“Green skills are considered important, but specialised positions in this field are very limited, and unfortunately there is no long-term planning. (P7)	Lack of career support		
Training on green skills often remains superficial. It raises general awareness but does not provide in-depth knowledge or expertise. (P13)	Insufficient depth of training	Training and Development	
Training is mostly theoretical; due to the lack of practical application and detailed content, we struggle to apply it to work processes. (P9)	Lack of technical skill development		
Sustainability goals are becoming increasingly complex; more comprehensive and advanced training is needed for employees to contribute effectively to these goals. (P8)	Need for advanced training		
Specific training plans such as sustainability reporting and carbon accounting should be developed for departments like finance. (P9)	Department-specific training		
Companies need regular and department-specific training programmes to develop green skills. (P10)			

This example demonstrates the systematic progression from raw data to thematic structure and supports the transparency of the analytical process.

4. Findings

This section presents the findings based on the thematic analysis of semi-structured interviews with employees in the private sector. The analysis identified six main themes, each comprising related sub-themes, which are elaborated in the following sections.

4.1. Forecasting Future Skill Disruptions

The first theme, “forecasting future skill disruptions” (see Table 5), reflects participants’ expectations of significant changes in the future workforce and the emergence of new and evolving skill areas.

Participants emphasised the need to strengthen long-term planning in areas such as data analytics and artificial intelligence, noting that strategic investments in these fields would enhance organisational and national competitiveness. They further highlighted that education programmes should be continuously updated in response to rapidly changing sectoral dynamics, particularly with respect to green skills, digital literacy, and cybersecurity. As one participant noted, “The EU Green Deal makes new skills in carbon management and digital transformation essential.” (P3) “In the future, the most prominent skills will be digital data tracking and sustainability measurement.” (P6)

Table 5. Main and Sub-Themes Related to the Theme of Forecasting Future Skill Disruptions

No	Main Theme	Sub-Theme
1.	Forecasting Future Skill Disruptions	1.1. Forecasting Critical Skill Areas
		1.2. Expectations from Policy and Education Systems
		1.3. Organizational Transformation and Emerging Occupational Profiles

Beyond forecasting future skill areas, participants expressed clear expectations regarding the role of education systems and policy. They argued that the current education system remains insufficiently responsive to the skill demands of the green transition, particularly due to the limited integration of sustainability and green job courses into university curricula. “Our education system should be more flexible and collaborate closely with industry” (P4). “Universities should make sustainability and green job courses compulsory.” (P7)

Participants further emphasised that organisational transformation is likely to lead to the emergence of new occupational profiles, while rendering some existing professions less relevant. However, they also noted that persistent hierarchical structures and slow decision-making processes continue to constrain organisational transformation. This suggests that organisations’ capacity to adapt to changing environmental and technological dynamics is weakened by structural barriers. “Sustainability education mostly remains theoretical; due to the lack of practical experience, graduates are not sufficiently prepared for the workplace.” (P14) “Some professions will become outdated, and new departments and roles will emerge.” (P5) “There is a need for faster, more inclusive, and learning-oriented mechanisms to enable employees who can integrate environmental awareness into business processes.” (P3)

These findings suggest that skill transformation is perceived not as gradual but as a disruptive shift driven by digitalisation and sustainability pressures. Participants’ emphasis on data analytics, artificial intelligence, and green skills indicates that organisations must anticipate emerging skill demands rather than react to them. At the same time, the mismatch between education systems and industry needs raises concerns about workforce readiness, while rigid structures and slow decision-making suggest that internal transformation is lagging behind external change.

4.2. Technical and Solution-Oriented Skill Demands

The second theme, “technical and solution-oriented skill demands,” reflects participants’ views on emerging technical competencies, measurement and reporting skills, and innovative problem-solving approaches in the context of sustainability and the green transition.

Table 6. Main and Sub-Themes Related to the Theme of Technical and Solution-Oriented Skill Demands

No	Main Theme	Sub-Theme
2.	Technical and Solution-Oriented Skill Demands	2.1. Measurement and Reporting Competencies
		2.2. Innovative Problem-Solving Skills

Participants emphasized the need to strengthen measurement and reporting competencies within organizational sustainability processes. The findings indicate that data-driven approaches are critical for monitoring and managing environmental performance. In particular, the systematic reporting of carbon footprints, energy consumption, and renewable investments, as well as the measurement of sustainability indicators in human resource management, were identified as key elements that enhance corporate accountability. One participant stated: “We need to improve our measurement and reporting competencies. Currently, we often rely on external services for this” (P10). Another participant highlighted existing skill gaps by noting: “When we look at the training requests coming from companies across different sectors, we see that expectations regarding green skills are largely centred on measurement, reporting, and the ability to work with numerical data. However, it is frequently expressed that both employees and new graduates are not sufficiently prepared in these areas (P12).

Participants emphasized that sustainability practices should not be limited to compliance-focused measures but should also be supported by innovative solutions. The findings indicate that traditional production and management systems are insufficient to meet current environmental goals, and organizations need to develop more creative, flexible, and technology-driven approaches. Innovative problem-solving skills are particularly valued in areas such as the circular economy, process optimization, and eco-design, serving not only to reduce environmental impact but also to enhance organizational efficiency. One participant highlighted this point, stating: “Traditional systems are outdated and do not deliver what is needed” (P12). “Interdepartmental collaboration is extremely important in the construction sector. For example, simply following energy efficiency guidelines is not enough. While the architecture team develops a design proposal that enhances the building’s passive energy use, the engineering team analyzes the technical feasibility of this design; meanwhile, the procurement department contributes to the process by researching reusable or low-carbon construction materials” (P14). This underscores the need to integrate green transformation with innovative thinking.

These findings indicate that technical green skills are not limited to measurement and reporting processes but also transform problem-solving approaches within organisations. Participants’ statements reveal that, in the context of sustainability, decision-making and solution-generation processes are increasingly evolving toward a more data-driven, interdisciplinary, and cross-functional coordination-based structure. This suggests that technical expertise alone is no longer sufficient; competencies such as analytical thinking, interdepartmental collaboration, and the development of innovative approaches have become critical in sustainability processes.

4.3. Green Skills as a Tool for Adaptation and Transformation

The third theme, “green skills as a tool for adaptation and transformation,” highlights their strategic role in enabling compliance with environmental regulations and enhancing competitive advantage for organisations.

Participants emphasized that green skills are no longer merely indicators of environmental awareness for organizations but have become essential for compliance with global regulations. They noted that rapid developments in sustainability and environmental policies, such as the European Green Deal, have increased the demand for a competent workforce in this field. One participant highlighted the inevitability of this transformation: “The world is changing. Companies that have gaps in sustainability and green skills will unfortunately not be able to catch up” (P11). Another participant stressed the critical role of green skills in adaptation: “Developing and maintaining the clean technologies required by the Green Deal is impossible without a skilled workforce in this area” (P1). Overall, the findings indicate that green skills have become a fundamental tool for ensuring compliance with environmental regulations and international standards.

Table 7. Main and Sub-Themes Related to Theme of Green Skills as an Adaptation and Transformation Tool

No	Main Theme	Sub-Theme
3.	Green Skills as a Tool for Adaptation and Transformation	3.1. Adaptation Tool
		3.2. Competitiveness Tool

Participants stressed that green skills are now regarded not only as a marker of environmental responsibility but also as a strategic factor determining corporate competitiveness. The findings indicate that as consumer environmental awareness increases, companies that internalize sustainability policies gain a competitive edge in terms of brand trust and reputation. In this context, sincerely supporting green skills within organizations helps ensure that environmental initiatives go beyond perceptions of “greenwashing.” One participant articulated this as follows: “Consumers are increasingly aware. Companies that are not green are losing credibility. To be genuinely green, organizations need to support green skills internally. When this support is sincere, initiatives go beyond greenwashing and build trust.” (P7) “Companies that invest in green skills not only adapt to environmental requirements but also stand out in the market.” (P4)

These findings indicate that green skills are not only tools for compliance with environmental regulations, but have also become a fundamental component of organisational competitiveness strategies. Participants’ statements reveal that sustainability practices are increasingly associated with brand value, corporate reputation, and customer trust. This suggests that green skills should be understood not merely as an operational requirement, but as a strategic resource that contributes to long-term competitive advantage.

4.4. Integration into Human Resources Strategy

The fourth theme, “integration into human resources strategy,” shows that organisations treat green skills as core competencies embedded in HR practices, including recruitment, training, career development, and performance systems.

Table 8. Main and Sub-Themes Related to the Theme of Integration into Human Resources Strategy

No	Main Theme	Sub-Theme
4.	Integration into Human Resources Strategy	4.1. Formal Recruitment Criteria
		4.2. Green Career Paths and Compensation Management
		4.3. Training and Development

Participants indicated that green skills are gaining increasing importance in recruitment processes. The findings suggest that prioritising environmentally conscious candidates supports both organisational culture change and long-term sustainability goals. However, participants noted that embedding these values within the existing workforce is time-consuming; therefore, integrating green skills into new recruitment practices was considered more effective. It was also emphasised that sustainability-related responsibilities should be explicitly stated in job advertisements to signal organisations’ environmental commitment at the recruitment stage. As one participant noted: “It is difficult to instil this philosophy in long-serving employees; however, a green-skills-oriented approach can be applied in new recruitments. Expectations related to green skills should be incorporated into job descriptions, and green responsibilities should be clearly defined” (P10). “Giving priority to candidates who hold sustainability-related certifications, as they demonstrate genuine interest in the topic, may be a good approach.” (P12)

The findings indicate that establishing sustainability-oriented career pathways has become a strategic necessity, with progress depending on stronger structural support. Although the creation of sustainability departments is an important step, participants noted that these units often remain peripheral within organisational priorities. Supporting green career paths through strategic planning, long-term investment, and effective remuneration policies was seen as essential for improving employee motivation

and retaining qualified professionals. As one participant stated, “Every company should have sustainability departments, yet these units still do not receive the attention they deserve, and new green roles often reduce employee motivation” (P1). “The lack of a comprehensive investment and compensation vision makes green career paths less attractive than traditional roles, leading talented individuals to avoid these positions.” (P8)

The findings show that in-house training is critical for embedding green skills, although its depth and continuity vary across organisations. While some firms integrate green awareness into onboarding, others treat sustainability training superficially. “Training programmes need to be regular and department-specific. Approaches focused solely on ethics limit the development of technical green skills.”(P10). “Sustainability goals are becoming increasingly complex; however, more comprehensive and advanced training is needed for employees to contribute effectively to these goals. Current programmes only introduce basic concepts, whereas we need in-depth knowledge in areas such as reporting, data management, and strategic planning.” (P8)

These findings indicate that the integration of green skills into human resource processes is not merely an operational practice but has become a fundamental component of organisational transformation. Participants’ statements reveal that recruitment, career development, and training processes are increasingly aligned with sustainability objectives. However, the effectiveness of this integration depends on organisations’ ability to develop a strategic approach toward green skills and support this area through adequate resources and incentive mechanisms.

4.5. Social Implications

The fifth theme, “social implications,” highlights how green skills extend beyond economic and environmental dimensions to shape corporate social responsibility and cultural transformation, driven by employee engagement, behavioural change, and intergenerational perspectives.

Table 9. Main and Sub-Themes Related to the Theme of Social Implications

No	Main Theme	Sub-Theme
5.	Social Implications	5.1. Symbolic Compliance
		5.2. Non-Internalised Awareness
		5.3. Intergenerational Perception

The findings indicate that some organisations treat green skills and sustainability initiatives as symbolic tools for corporate image building rather than as drivers of strategic transformation. In such cases, sustainability practices are reduced to reporting mechanisms, limiting their social impact and failing to meaningfully include disadvantaged groups. As one participant noted, these initiatives function mainly as “symbolic compliance” indicators in sustainability reports, without generating tangible social benefits (P2). “Some organisations use sustainability policies merely as a showcase. In practice, there is no real implementation, but they aim to appear compliant externally.”(P5)

The findings indicate that employees’ sustainability awareness often remains at the level of knowledge and is not fully translated into behaviour. Although green skills are formally embedded in organisational policies, employees frequently perceive them as a “mandatory procedure,” limiting innovation and problem-solving. However, participants noted that voluntary-based practices can foster deeper internalisation of sustainability values. As one participant stated, sustainability is often viewed merely as an obligation (P6), while another highlighted that voluntarism-based local initiatives enable employees to internalise environmental responsibility more meaningfully (P3).

The findings show that generational differences significantly shape the adoption of green skills within organisations. Younger employees are generally more adaptable to sustainability-related practices, while more experienced employees often face adjustment difficulties, creating gaps in knowledge sharing and value transfer. As one participant noted, “New university graduates are quite adaptable when it comes to green skills, but for the older generation, this is a problem” (P1). “Combining the institutional knowledge of

experienced employees with the innovative capabilities of younger generations strengthens internal learning and sustainable knowledge transfer.” (P6)

These findings indicate that green skills are not merely a technical or operational issue within organisations, but also require a deeper cultural transformation. Participants’ statements reveal that sustainability practices may remain at a symbolic level and are not always fully internalised by employees. This suggests that organisational transformation cannot be achieved solely through policies and procedures, but must also be supported by employee behaviours and values. In addition, generational differences influence the adoption of green skills, highlighting the importance of managing learning processes and knowledge transfer within organisations.

4.6. Sustainability Data Analytics and Information Presentation

Finally, the theme of “sustainability data analytics and information presentation” highlights organisations’ ability to collect, analyse, and effectively communicate sustainability data, emphasising the importance of simplification and data storytelling.

Table 10. Main and Sub-Themes Related to the Theme of Sustainability Data Analytics and Information Presentation

No	Main Theme	Sub-Theme
6.	Sustainability Data Analytics and Information Presentation	6.1. Simplification of Reporting Language
		6.2. Data Storytelling

Within the sub-theme of “Simplification of Reporting Language,” participants emphasised the critical role of simplified communication and reporting in developing and disseminating green skills at the organisational level. The findings indicate that expressing complex environmental indicators in clear and accessible language helps employees adapt to green skills more quickly and translate them into practice. This approach particularly enables employees who are new to sustainability to better understand their areas of environmental impact, improve their data literacy, and strengthen their strategic thinking abilities. One participant described this process as follows: “We simplified our reporting language on green performance by focusing on key indicators. As a result, new talents who are just beginning to develop green skills no longer get lost among complex metrics — they can quickly grasp the main areas of environmental impact” (P11). “The technical terms used in reports are very complex. If a more understandable language were used, everyone could follow them.” (P14).

Within the Data Storytelling sub-theme, participants highlighted the growing importance of integrating green skills with data analytics and visual communication. The findings indicate that presenting sustainability data through story-driven visualisations—rather than solely technical reports—enhances internal decision-making and improves external stakeholders’ understanding of environmental performance. This underscores the strategic relevance of green skills such as data literacy and visualisation competence. As one participant noted, transforming ESG data into visual narratives has become a corporate standard that accelerates decision-making and clarifies sustainability goals for investors and the public (P11). “Sustainability data becomes both more understandable and more persuasive when it is presented through relationships and examples.” (P6)

Overall, the findings indicate that green skills have evolved beyond being merely an environmental requirement into a core, multidimensional competency that drives organisational transformation. Through the integration of technical expertise, ethical responsibility, social awareness, and analytical thinking, these skills enhance competitiveness and support alignment with sustainable development goals. In this context, sustainability data has also moved beyond a purely technical reporting function to become an integral part of strategic decision-making; simplification and data storytelling make this information more accessible and impactful, thereby strengthening organisations’ data-driven decision-making capabilities.

5. Discussion

This study shows that green skills are a key driver of sustainable transformation at individual, organisational, and societal levels (Fuchs, 2023; Vona et al., 2018). They have evolved beyond an environmental requirement into a strategic competence shaping competitiveness and HR strategies. The findings also highlight their multidimensional nature, moving beyond a purely technical view. From a dynamic capabilities perspective, green skills enable organisations to sense change, seize opportunities, and transform processes (Teece et al., 1997).

From a sensing perspective, regulatory pressures such as the European Green Deal and the Paris Climate Agreement emerge as key drivers of green skills transformation, in line with existing studies (Strachan et al., 2023; Vona et al., 2018). More importantly, the findings reveal that sensing is increasingly linked to digital literacy and data analytics, pointing to a growing intersection between green and digital transformation. At the same time, a persistent mismatch between education systems and industry needs reinforces the skill gap highlighted in the literature (da Costa et al., 2022).

At the seizing stage, green skills are closely intertwined with communication, problem-solving, and collaboration. This supports prior work emphasising their behavioural and value-based dimensions (CEDEFOP, 2013; OECD, 2023). However, the findings show that organisational efforts to integrate these skills into HR processes often remain superficial. In the absence of clear career pathways and incentive structures, green skills risk being reduced to symbolic practices or greenwashing. This observation reinforces earlier critiques of sustainability initiatives while providing direct evidence from employee experiences.

At the transforming stage, organisational change is supported not only by technical training but also by simplified reporting and data storytelling. These practices enhance employee engagement and facilitate the integration of sustainability into daily work processes. In addition, the interaction between younger employees' innovation-oriented capabilities and senior employees' experience highlights the social dimension of transformation, complementing insights from organisational learning literature.

From a managerial perspective, green skills should be systematically embedded into HR processes, including recruitment, training, performance systems, and career development. Importantly, this integration should move beyond policy statements and be reflected in concrete practices such as job descriptions and function-specific training programmes. Furthermore, simplifying and effectively communicating sustainability data plays a key role in ensuring that these skills are meaningfully integrated rather than remaining symbolic.

From an educational and policy perspective, universities and policymakers play a critical role in aligning green skills with labour market needs. Higher education institutions should integrate interdisciplinary sustainability competencies into curricula, combining technical knowledge with managerial and behavioural skills. In addition, stronger collaboration between universities and industry is essential to reduce the existing skill mismatch and to ensure that graduates are equipped with practical, application-oriented capabilities. Policymakers, on the other hand, should support this transition by developing incentive structures, funding mechanisms, and regulatory frameworks that encourage organisations to invest in green skills development. Moreover, public policies should promote lifelong learning and reskilling initiatives to facilitate workforce adaptation in the context of sustainability transitions.

This study has several limitations. The absence of audio or video recordings and the reliance on researcher notes may have constrained the depth of the analysis. In addition, although participants were drawn from different sectors, systematic cross-sectoral comparisons were not possible, and the generalisability of the findings remains limited. Future research could examine the impact of green skills on organisational performance and environmental outcomes using quantitative or mixed methods. Longitudinal designs may further clarify how these skills evolve over time, while multi-level studies could explore how individual capabilities translate into organisational strategies. Finally, developing measurement scales would enable more systematic and comparable analysis of green skills.

6. Conclusion

This study shows that green skills have evolved from an environmental requirement into a strategic capability shaping organisational transformation and workforce development. The findings indicate that these skills are increasingly integrated into core organisational processes while transforming traditional competencies. However, their implementation often remains uneven and symbolic, highlighting the need for stronger alignment between sustainability goals and organisational practices. Overall, the study positions green skills as organisational capabilities that enable sustainable transformation.

Declarations and Disclosures

Ethical Responsibilities of Authors: The author of this article confirms that her work complies with the principles of research and publication ethics.

Ethical Approval: Ethical approval was obtained from the Ethics Committee of İstanbul Kültür University, dated 13/11/2025, and Meeting Number 08.

Conflicts of Interest: No potential conflict of interest was reported by the author.

Funding: The author received no financial support for the preparation and/or publication of this article.

Author Contributions: The author confirms sole responsibility for conceptualization and design, data collection, analysis of data and interpretation of results, writing the first draft of the manuscript, and review and editing.

Plagiarism Checking: This article was screened for potential plagiarism using a plagiarism screening program.

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Appendix

A1. Semi-Structured Interview Questions

How do you define the concept of green skills in today's business environment?

How is the sustainability approach reflected in your organisation or field, particularly in recruitment and training processes?

What types of practices or training programmes are implemented to enhance employees' sustainability awareness and green skill development?

In your opinion, how are traditional soft skills (such as communication, adaptability, and teamwork) transforming within the context of the green transition?

5. Which skills do you believe will become more important for building a sustainable workforce in the future?